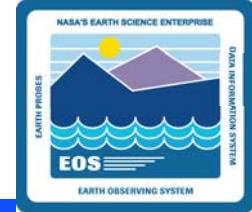


# ECS SDP Internal Training



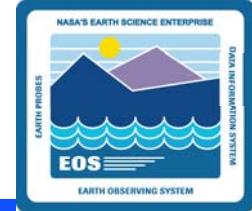
# Objectives

- **Overall objective: Describe ECS structure and function for Science Data Processing (SDP)**
  - Identify subsystems and Computer Software Configuration Items (CSCIs)
  - Specify major components and functions/processes of CSCIs
  - Describe role of CSCIs/functions/processes in the context of ECS operational scenarios
    - ASTER-specific functions (e.g., DAR, expedited data support)
    - Producing and distributing data products (including media)
    - Updating QA metadata
    - On-demand processing
    - User registration

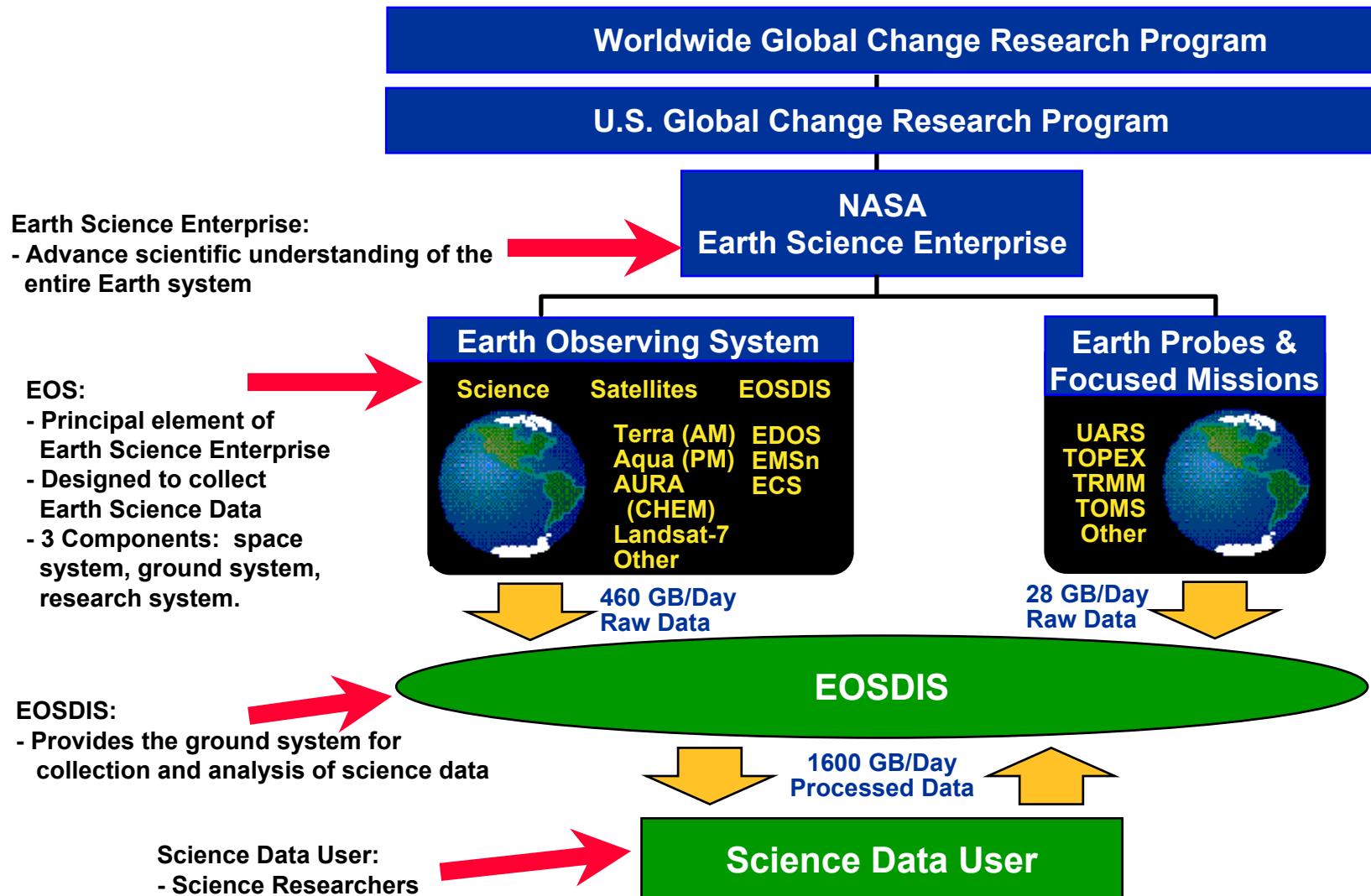


# What This Lesson Is (and Is Not)

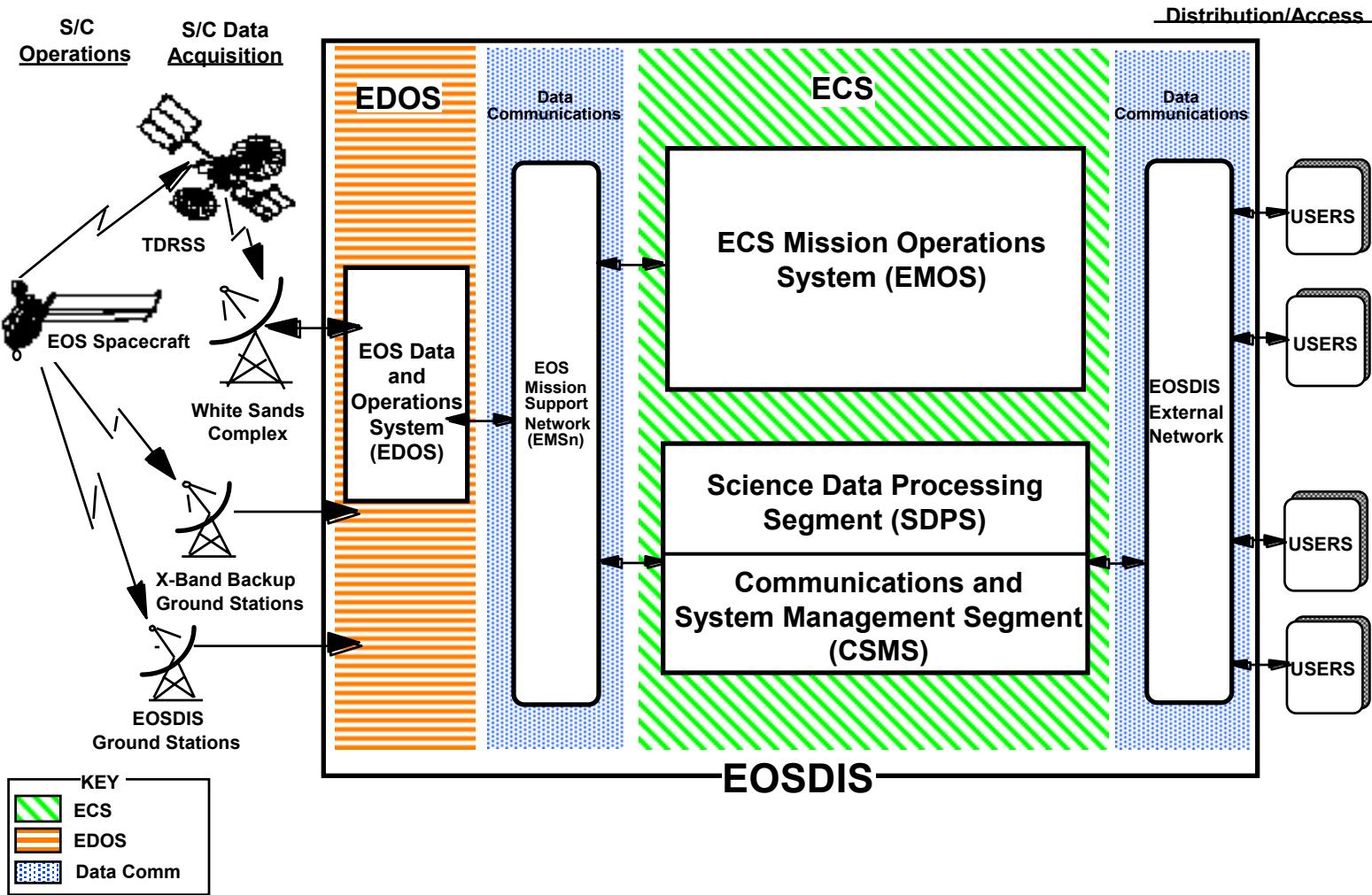
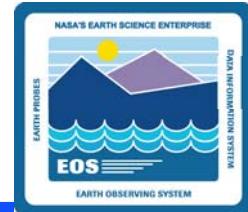
- **Is**
  - Brief illustration of ECS high-level structure
  - Introduction to subsystems that make up ECS at a site
  - Examination of each subsystem and its Computer Software Configuration Items (CSCIs), with components
    - Introduction of all system elements and brief description of functions
    - Background for subsequent scenario-based presentation of system functional flows
  - Detailed look at system functioning in the context of operational scenarios
- **Is Not**
  - Full description of overall ECS structure and function
  - Description of specific individual ECS entities (e.g., SMC)
  - Software development lesson
  - Complete description of interfaces and event sequences
  - Operations training

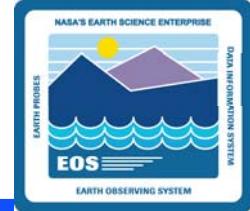


# Program Overview

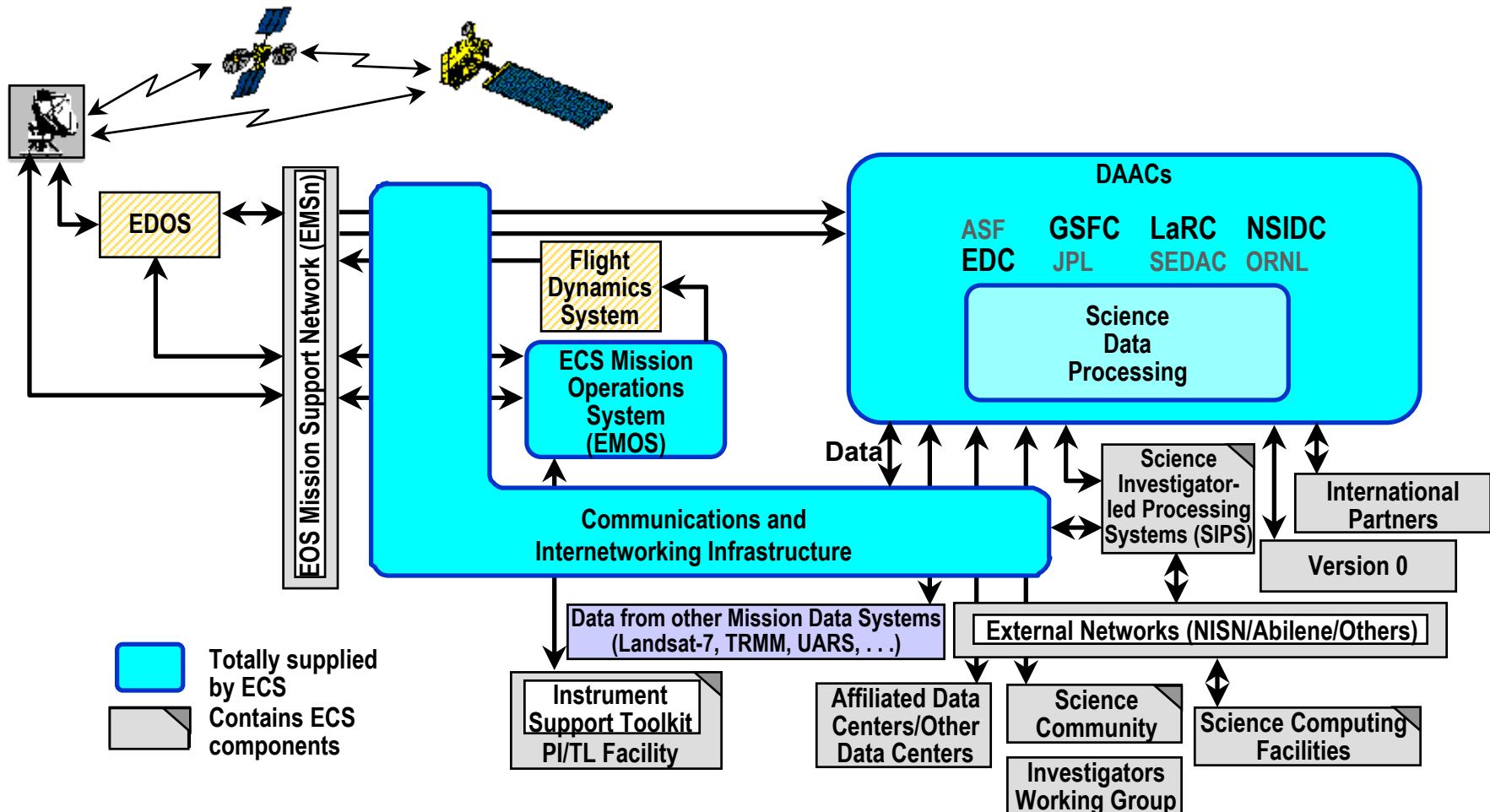


# EOSDIS Principal Components





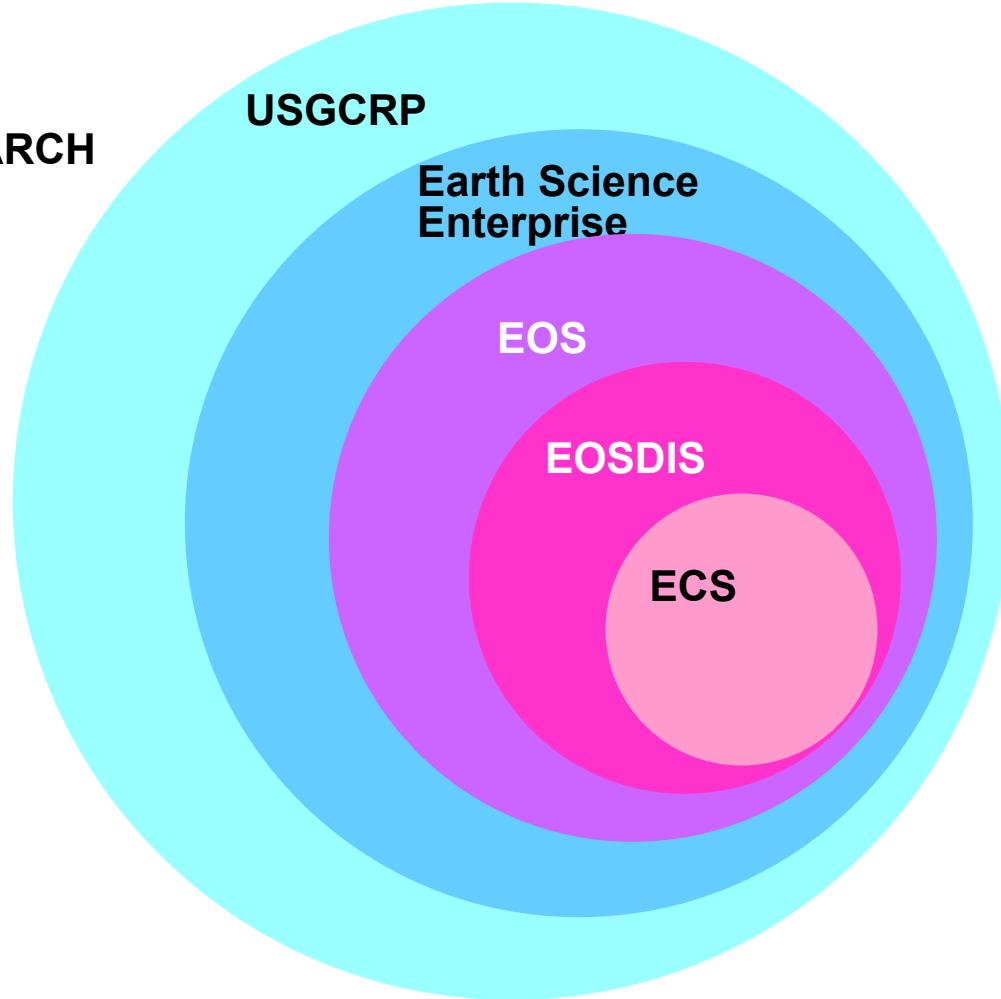
# EOSDIS Data Flow



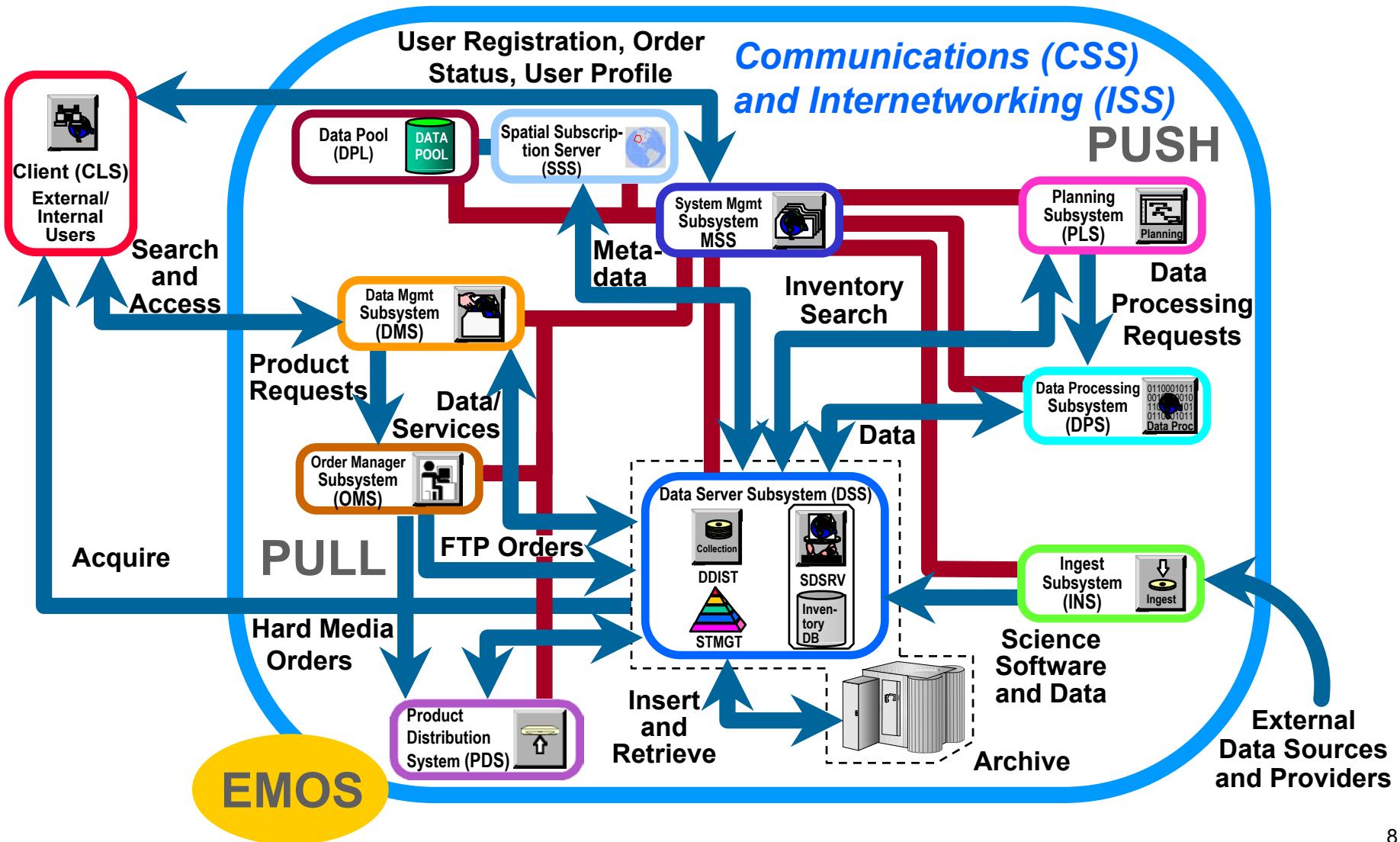
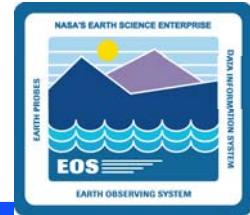
# Relationship of ECS to Global Change Research

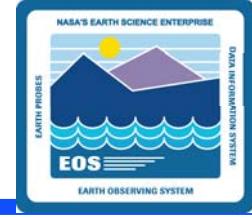


**WORLDWIDE  
GLOBAL CHANGE RESEARCH**



# ECS SDP Context





# Subsystems and Functions

## *Science Data Processing Segment (SDPS)*

- **Data Server Subsystem (DSS)**
  - Data storage and management: archive science data (with related insert, search and retrieve functions), archive management, data resource staging
- **Product Distribution System (PDS)**
  - Service for hard media orders, in conjunction with DSS and OMS
- **Ingest Subsystem (INS)**
  - Interface with external data providers and transfer data into ECS (with related staging functions and operator interfaces)
- **Spatial Subscription Server (SSS)**
  - Creation and management of subscriptions for data distribution/notification and for Data Pool insert



# Subsystems and Functions (Cont.)

## *SDPS (Cont.)*

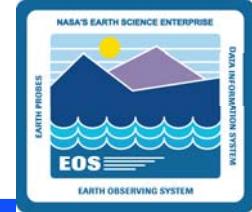
- **Data Pool (DPL)**
  - Provides on-line access for browsing and FTP download of selected granules, metadata, and browse data
- **Client Subsystem (CLS)**
  - Provides interfaces and access for external users
- **Data Management Subsystem (DMS)**
  - Enables cross-site data search and retrieval; gateway for interface of ECS with EOS Data Gateway Web Client (Version 0 IMS) protocolOrder Manager Subsystem (OMS)
  - Manages orders from EDG and other sources, distributing them to appropriate ECS services (SDSRV, PDS)



# Subsystems and Functions (Cont.)

## *SDPS (Cont.)*

- **Planning Subsystem (PLS)**
  - Long- and short-term planning of science data processing, and management of production resources
- **Data Processing Subsystem (DPS)**
  - Dispatches and monitors execution of science software



# Subsystems and Functions (Cont.)

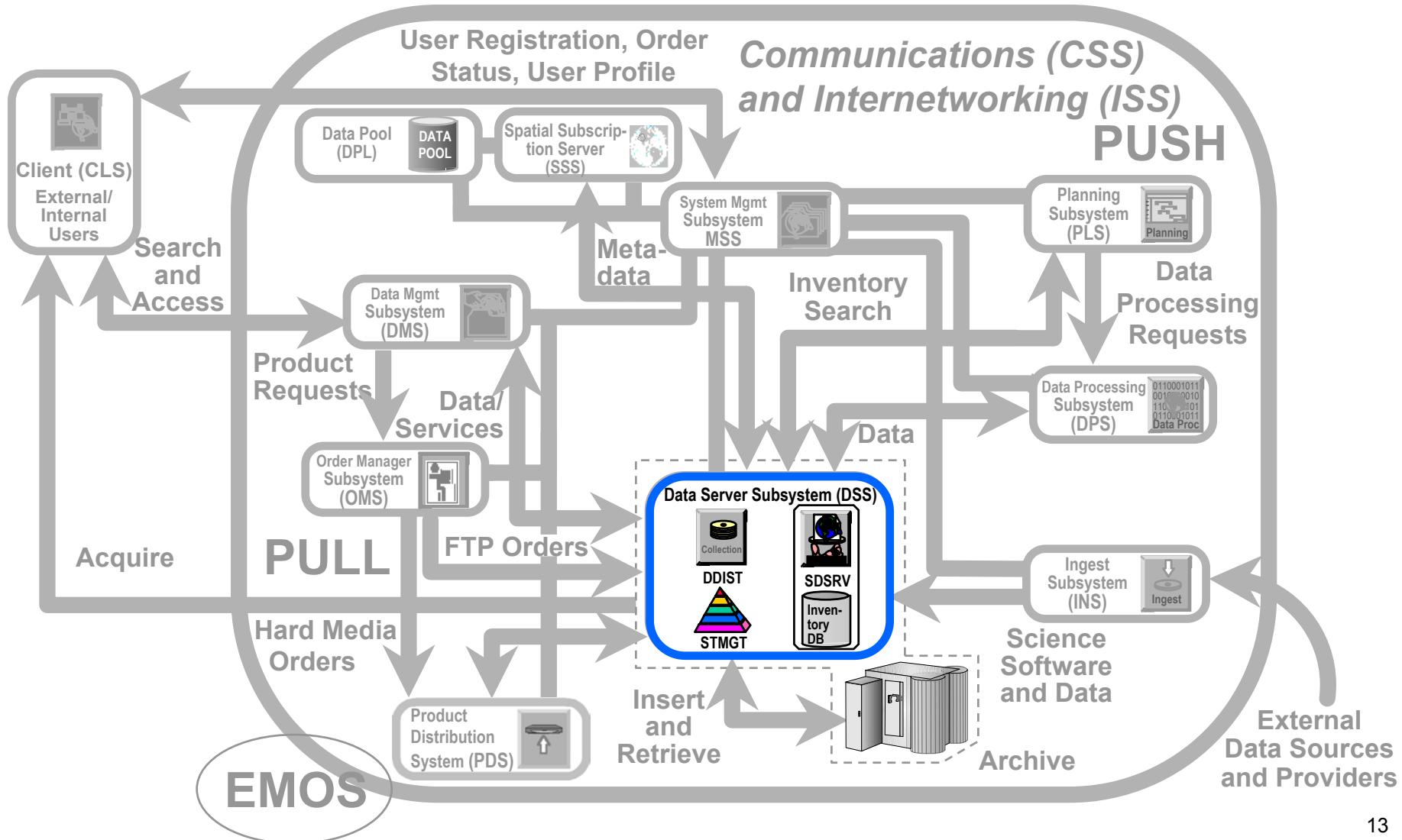
## *Communications and System Management Segment (CSMS)*

- **System Management Subsystem (MSS)**
  - System maintenance, management, and administration (includes trouble ticketing, baseline and configuration management, fault and performance monitoring, and user account management and order management)
- **Communications Subsystem (CSS)**
  - General system infrastructure functions (includes network communications, libraries to standardize software mechanisms, application error handling, subscription service, interfaces to e-mail, file transfer and file copy)
- **Internetworking Subsystem (ISS)**
  - Networking hardware devices and embedded software

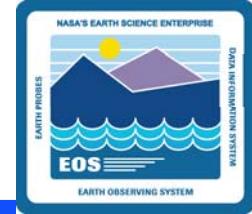
***NOTE: The ISS is part of the ECS infrastructure and is not addressed in detail in this course.***



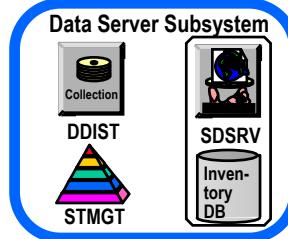
# Subsystems and CSCIs: DSS



# Subsystems and CSCIs: DSS (Cont.)



- **Data Server Subsystem (DSS)**
  - Provides capabilities to store, search, retrieve, and distribute earth science and related data
  - Client-server information transfer is by commands and requests
  - Generates Universal References to identify ECS entities
    - Granule UR: represents a granule in the data server (e.g., as follows)

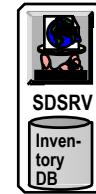
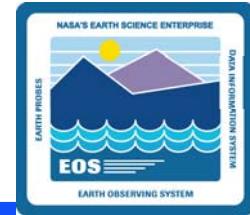


A granule is the smallest piece of data that is independently managed by the system, i.e., represented by a record in the inventory.

UR:10:DsShESDTUR:UR:15:DsShSciServerUR:13:[GSF:DSSDSRV]:16:SC:MOD10\_L2:1411

- Server UR: represents a specific running data server application (e.g., [DsShSciServerUR](#) )
- Interfaces with virtually all ECS subsystems and components
- Uses several COTS tools: RogueWave tools and libraries, Sybase relational database, Spatial Query Server

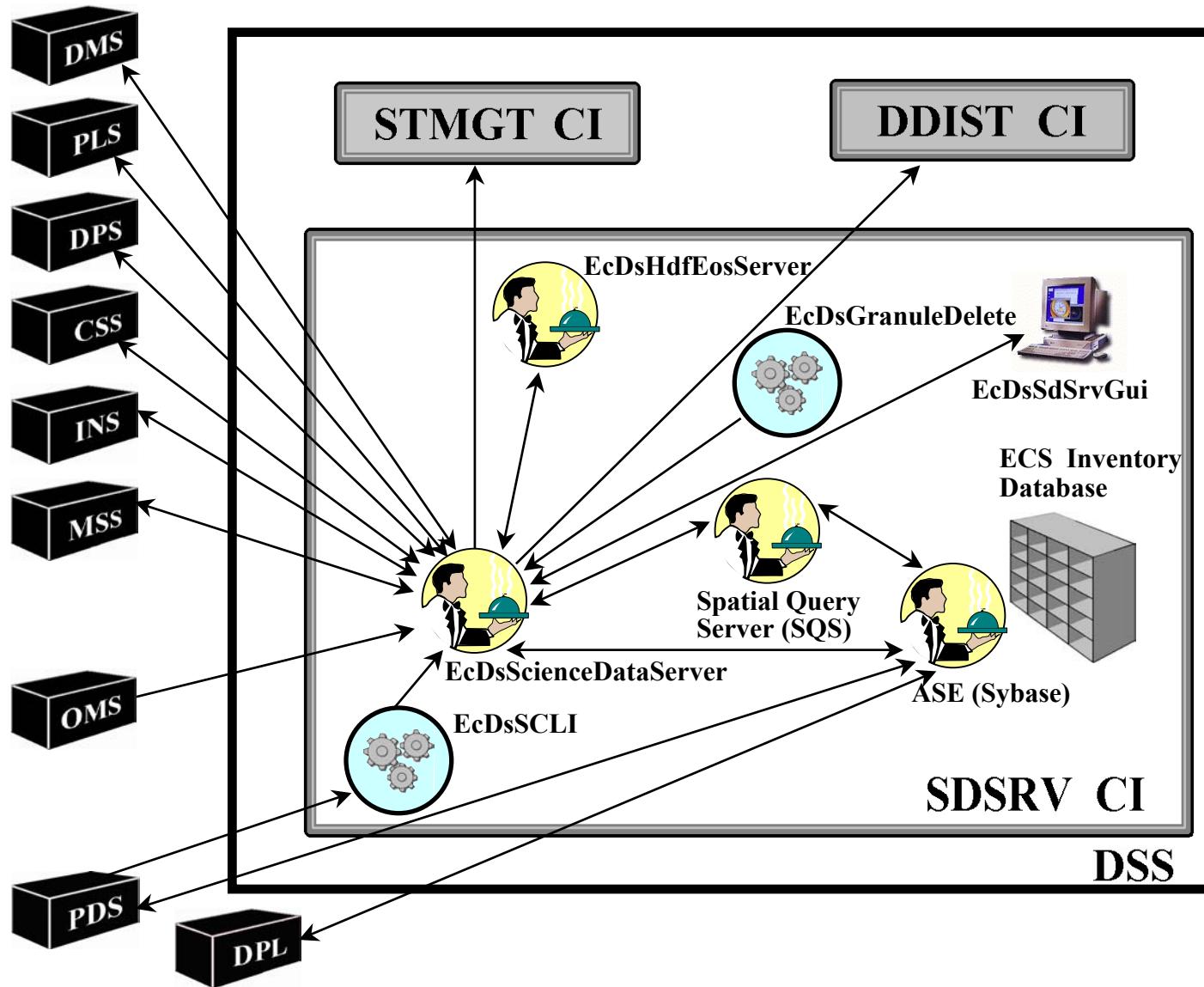
# Subsystems and CSCIs: DSS (Cont.)



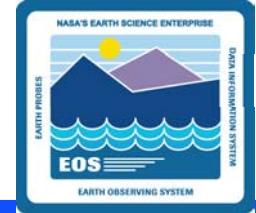
- **Science Data Server (SDSRV) CSCI**
  - Provides the ECS with a catalog of Earth Science Data holdings, and the Earth Science Data Type (ESDT) services that operate on the data
  - Manages and provides user access to data collections through its catalog of metadata and mechanisms to acquire data from the archive
  - Seven major components
    - **Science Data Server** - services requests for storage, search, retrieval, and manipulation of science data
    - **HDF EOS Server** - provides science data subsetting
    - **Science Data Server GUI** - provides operator interface
    - **Granule Deletion Administration Tool** - provides a command-line interface for deleting granules
    - **Science Data Server Command Line Interface (SCLI)** - provides interface to the S4PM processing system and the Product Distribution System (PDS)
    - **Sybase ASE Server** - manages catalog (metadata)
    - **SQL Server** - manages catalog (specialized spatial searches)

# Subsystems and CSCIs: DSS (Cont.)

## SDSRV Architecture and Interfaces



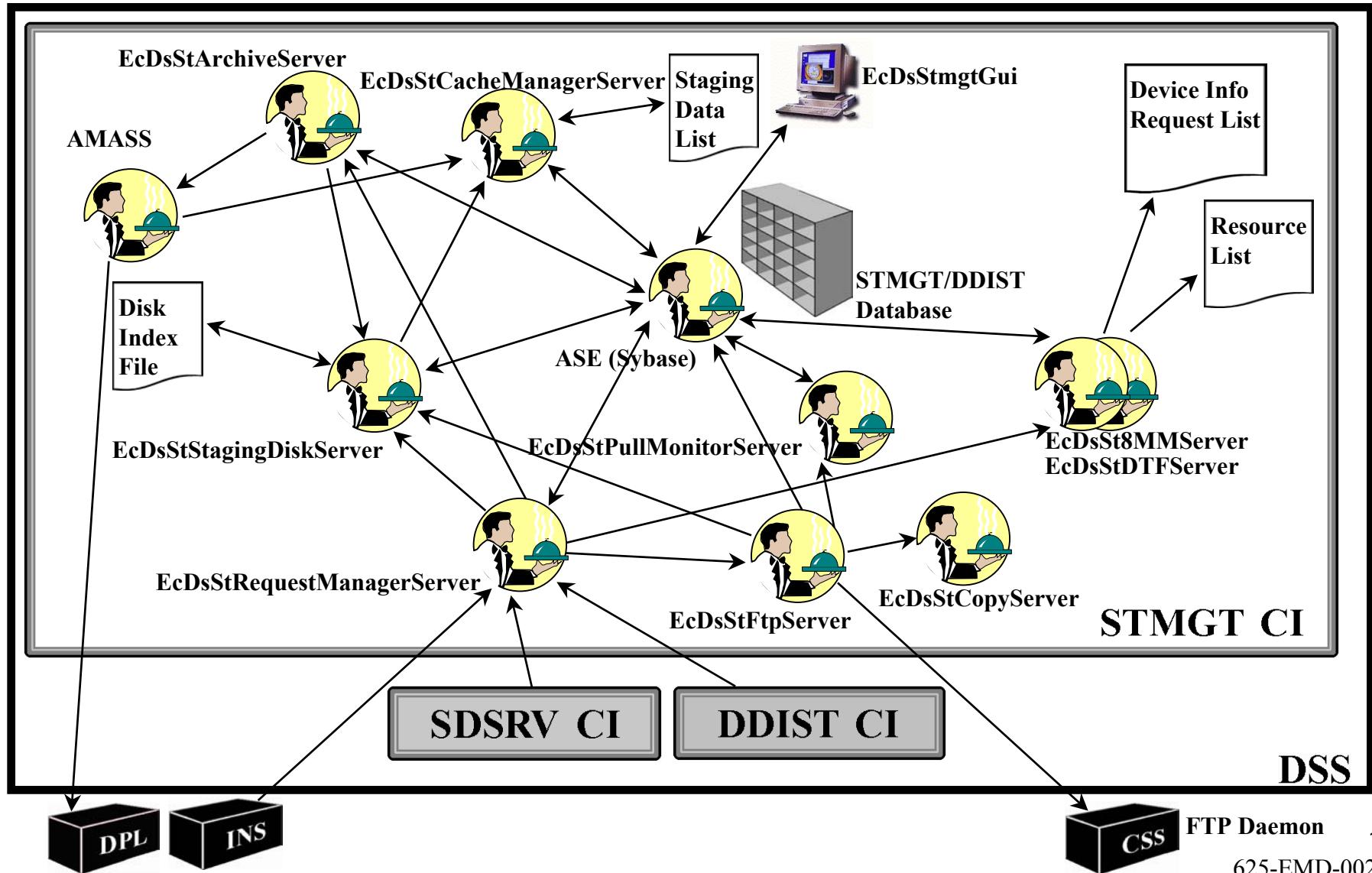
# Subsystems and CSCIs: DSS (Cont.)



- **Storage Management (STMGT) CSCI** 
  - Stores, manages, and retrieves data files on behalf of other science data processing components
  - Six major components
    - **Archive Server** - provides GUI and access to stored data
    - **Cache/Staging Manager** - Cache Manager server and Staging Disk server manage data files that have been retrieved from the archive and placed into a cache area on staging disk
    - **Media Server Process** - schedules access to shared peripheral resources (FTP, secure copy) and devices for Ingest (8mm, DTF-2)
    - **Pull Monitor** - links to Cache Manager to manage files in the user pull area, deleting them as they are retrieved by users or as their time-out periods expire
    - **Request Manager** - routes requests from clients to servers
    - **Data Base** - contains data tables for STMGT devices, cache management, event and log management, requests, and related functions

# Subsystems and CSCIs: DSS (Cont.)

## STMGT Architecture and Interfaces



# Subsystems and CSCIs: DSS (Cont.)



## • Data Distribution (DDIST) CSCI

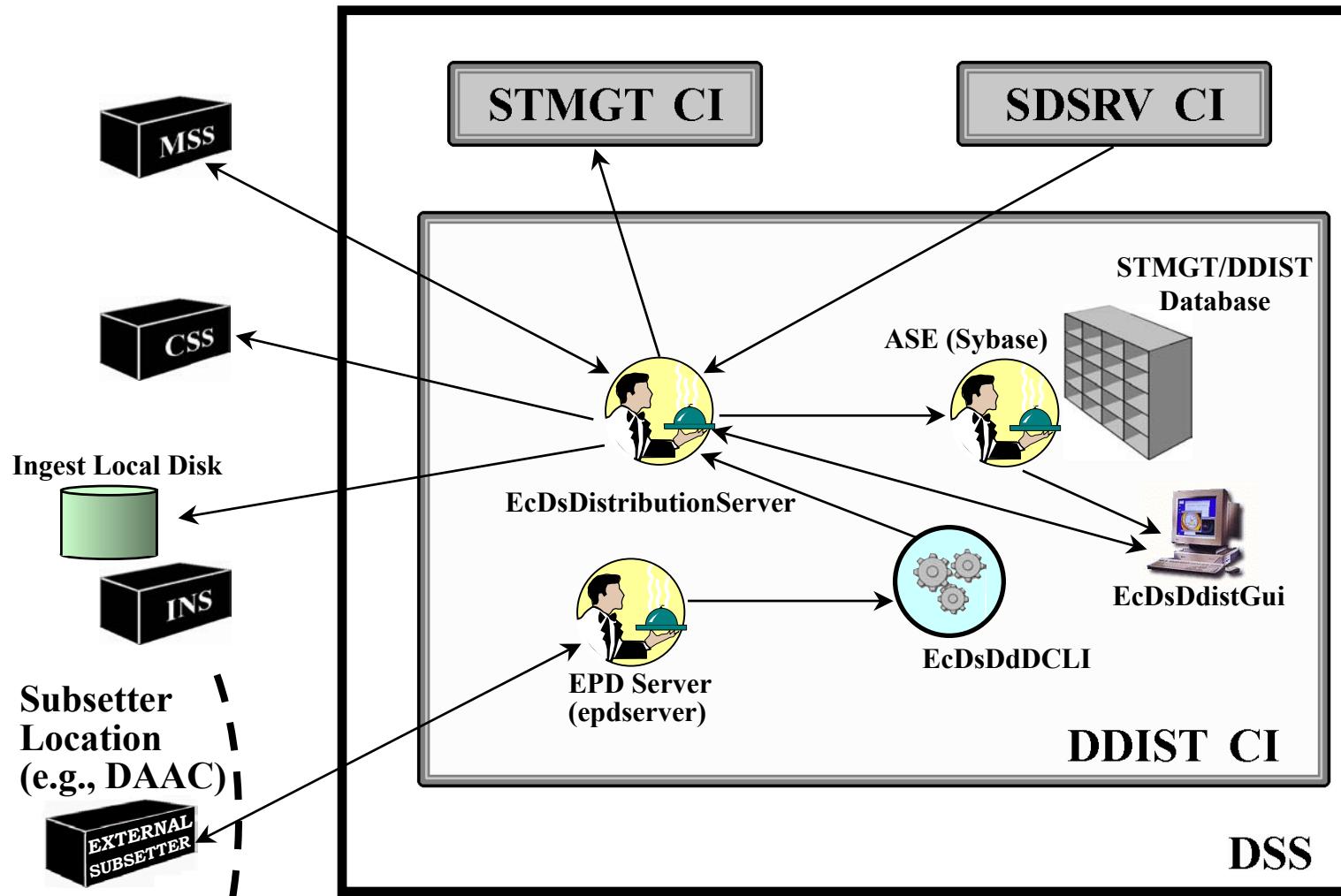
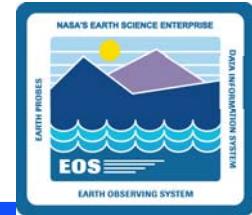


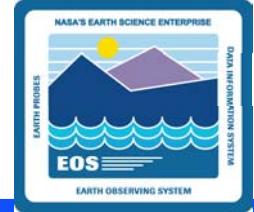
DDIST

- Monitors and controls processing of requests for internal and external electronic distributions; distributions on physical media (8mm tape, CD-ROM, DVD, Digital Linear Tape) are handled as Product Distribution System (PDS) requests via FTPPush onto a PDS working directory, from which PDS reads the data for copy to hard media
- Sends e-mail notifications
- Supports distribution of externally subsetted products
- Five major components
  - **Data Distribution Server** - provides control and coordination for data distribution through request processing
  - **Data Distribution GUI** - allows operations staff to initiate, track, and manipulate distribution requests
  - **Data Base** - contains the request list; updates and provides the request configuration
  - **External Product Dispatcher (EPD)** - receives products from external subsetter and transfers them via DCLI to DDIST
  - **DDIST Command Line Interface (DCLI)** - submits distribution requests for distribution of externally subsetted products

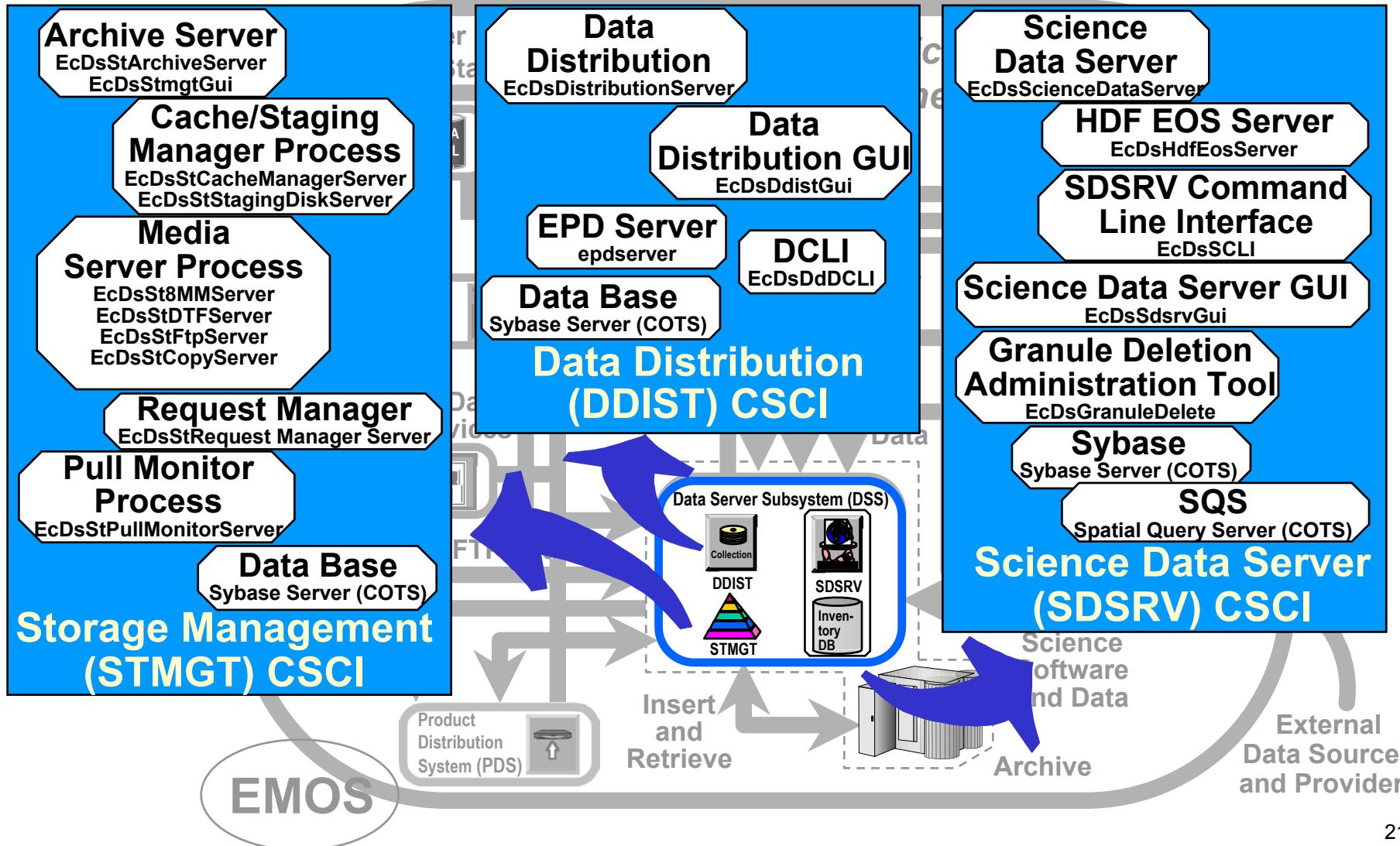
# Subsystems and CSCIs: DSS (Cont.)

## DDIST Architecture and Interfaces

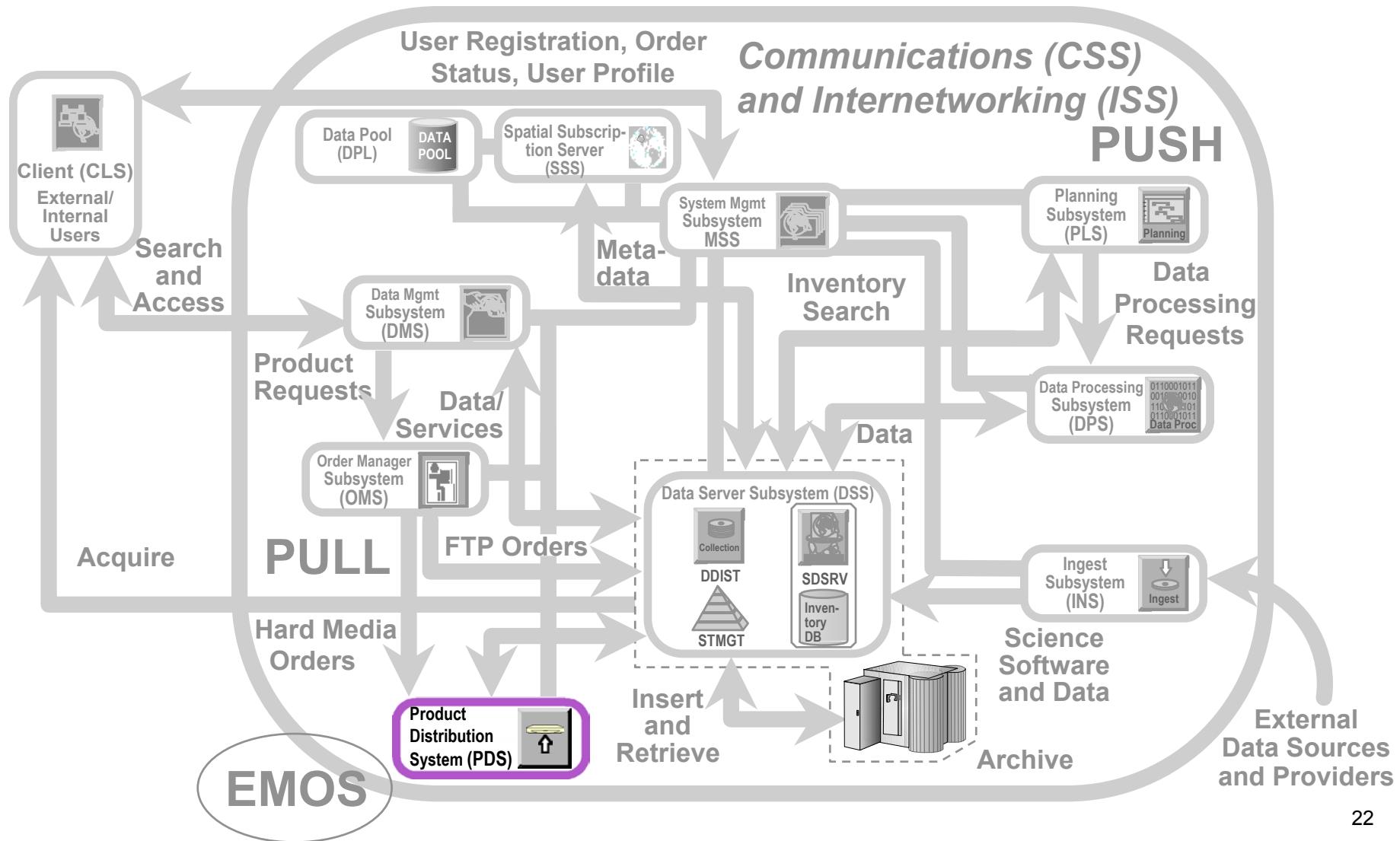




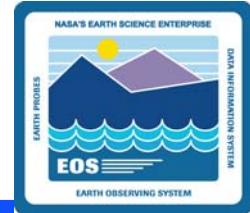
# Subsystems and CSCIs: DSS (Cont.)



# Subsystems and CSCIs: PDS



# Subsystems and CSCIs: PDS (Cont.)

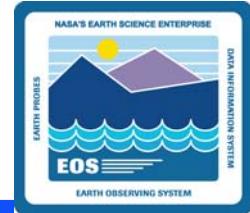


- **Product Distribution System (PDS)**
  - Provides product distribution support on the following types of physical media:
    - » Compact disk (CD)
    - » DVD
    - » Digital linear tape (DLT)
    - » 8mm tape
  - Generates other media-related items:
    - » Media labels
    - » Jewel-box inserts (for products on CD or DVD)
    - » Shipping labels
    - » Packing lists
  - Supports media quality check (QC) before shipment

Product  
Distribution  
System (PDS)

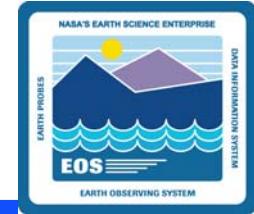


# Subsystems and CSCIs: PDS (Cont.)



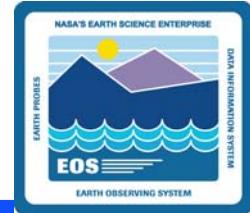
- **Product Distribution System (PDS) (Cont.)**
  - Sends Distribution Notice (DN) to customer via e-mail
  - Provides storage for up to 438GB of digital data
  - Provides a production capability in a 24-hour time period equivalent to 535GB of digital data
  - Two principal elements:
    - » Product Distribution System Interface Server (PDSIS)
    - » Product Distribution System Stand Alone (PDSSA)
  - Uses several COTS tools: Oracle relational database management system, Rimage PowerTools, Rimage Production Server

# Subsystems and CSCIs: PDS (Cont.)

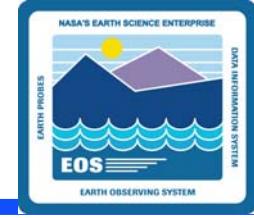


- **Product Distribution System Interface Server (PDSIS)**
  - Provides the interface between ECS and the PDSSA in accordance with the applicable Interface Control Documents (ICDs) and system specifications
  - Accepts multiple digital product requests in the form of Object Description Language (ODL) files from the Order Manager Server (OMS)
  - Requests digital product data from ECS in product request parameter files that are sent via the Science Data Server (SDSRV) Command Line Interface (SCLI)
  - Receives digital product data from ECS via ftp push
  - Coordinates PDSSA processing to include detection and resolution of data transfer problems, data flow control, and order recovery

# Subsystems and CSCIs: PDS (Cont.)



- Product Distribution System Interface Server (PDSIS) (Cont.)
  - Generates packaging and shipping artifacts
    - Packing lists
    - Shipping labels
    - E-mail distribution notices
  - Eight major components
    - **PDSIS Operator Interface (PDSIS OI)** - provides the primary means by which the operator monitors and controls order processing
    - **PDSIS Maintenance Module** - provides an additional means by which the operator can respond to problems with order processing
    - **PDSIS Server (ECSPDSServer)** - detects hard media distribution request from ECS and inserts data concerning the request into the PDS database

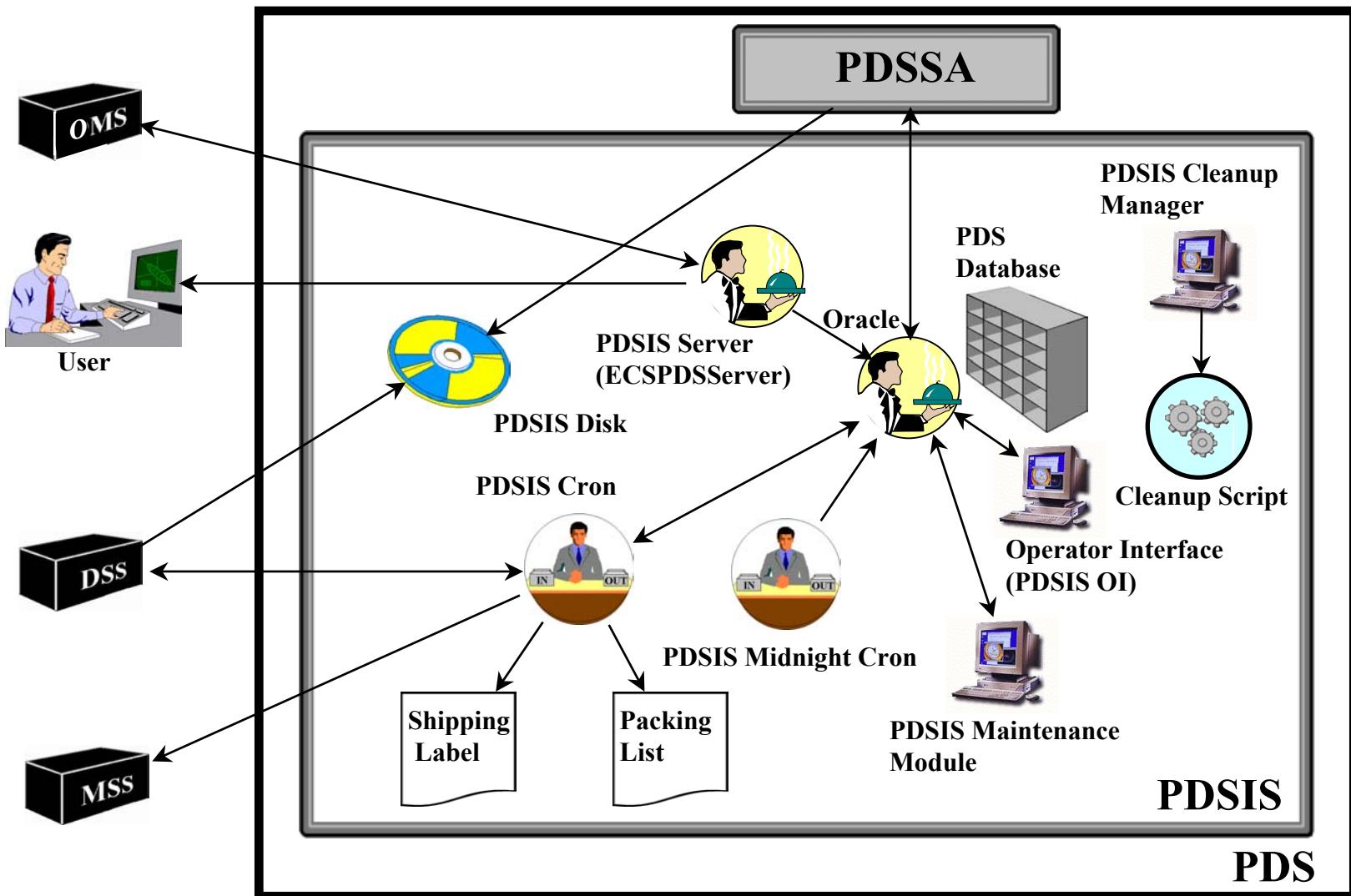
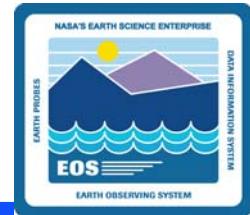


# Subsystems and CSCIs: PDS (Cont.)

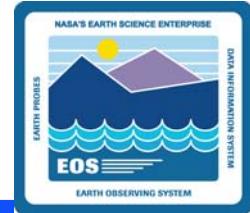
- Product Distribution System Interface Server (PDSIS) (Cont.)
  - Eight major components (Cont.)
    - **PDSIS Cron** - at regular intervals spawns threads (as necessary) to handle acquire requests to ECS, printing of shipping documents, ECS order-tracking database updates, and a number of other PDSIS activities
    - **PDSIS Midnight Cron** - performs database maintenance and updates log files at regular intervals
    - **PDSIS Cleanup Manager** - GUI used for specifying a cleanup strategy and generating a Bourne shell script to implement the strategy
    - **Cleanup script** - script invoked via cron to implement the PDSIS cleanup strategy
    - **Oracle database server** - manages PDS order and job data for both PDSIS and PDSSA

# Subsystems and CSCIs: PDS (Cont.)

## PDSIS Architecture and Interfaces

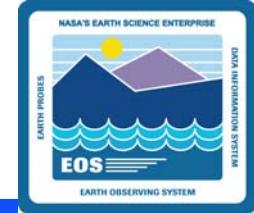


# Subsystems and CSCIs: PDS (Cont.)



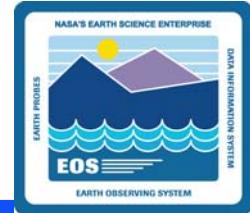
- **Product Distribution System Stand Alone (PDSSA)**
  - Transfers digital products to physical media
  - Acquires digital products from disk, resolves and detects transfer problems, and re-pulls data
  - Transfers digital products to any of the following types of physical media:
    - » CD-ROM
    - » DVD-ROM
    - » High-density 8mm tape
    - » DLT 7000c
  - Prints labels for tape products; prints labels on CD-ROM and DVD-ROM; and prints jewel case inserts
    - » Labels include basic order-level information (e.g., Order #, Req\_ID, date)

# Subsystems and CSCIs: PDS (Cont.)



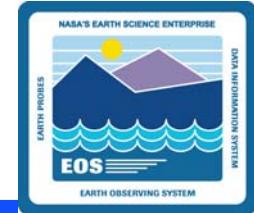
- **Product Distribution System Stand Alone (PDSSA) (Cont.)**
  - Removes digital source files upon completion of a media product
  - Supports management of PDSSA data, job status, and reports
  - Supports management of PDSSA operations through operator interfaces
  - Eleven major components
    - **PDS Operator Interface (PDSOI)** - provides the primary means by which the operator monitors and controls job processing
    - **PDS Job Monitor (JOBMON)** - acts as the interface for the operator to have a graphical view of system resources, as well as to have the capability to check the status of current production jobs in some detail

# Subsystems and CSCIs: PDS (Cont.)



- Product Distribution System Stand Alone (PDSSA) (Cont.)
  - Eleven major components (Cont.)
    - **PDS Quality Check GUI (EcPdSaQCGui)** - provides an operator interface for verification (QC) of products
    - **PDS Maintenance Module** - provides an additional means by which the operator can respond to problems with job processing
    - **PDSTOP** - in response to a production parameter file (PPF) from the PDSOI calls the appropriate Production Module (PM) to process a job
    - **Production Modules (e.g., genericout)** - in response to production tasking (PPF) assembles the required product data, conducts volume-spanning calculations, generates product media, and passes status and production file information back to PDSOI

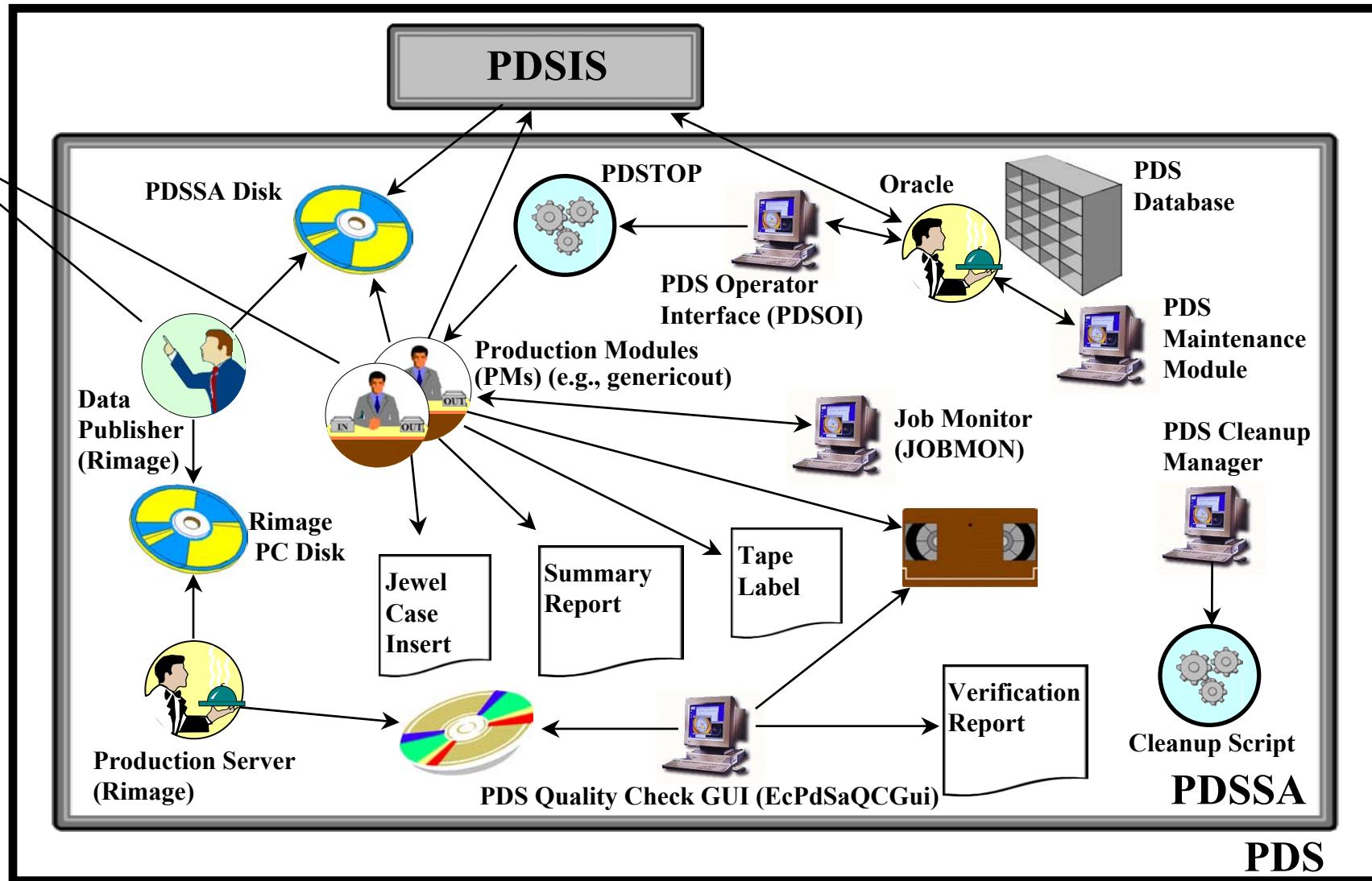
# Subsystems and CSCIs: PDS (Cont.)



- Product Distribution System Stand Alone (PDSSA) (Cont.)
  - Eleven major components (Cont.)
    - Rimage Data Publisher - polls the PDS job control directory for files to transfer and transfers the data by ftp to the Rimage PC disk
    - Rimage Production Server - manages production of (writing the data to disk) the CDs and DVDs
    - PDS Cleanup Manager - GUI used for specifying a cleanup strategy and generating a Bourne shell script to implement the strategy
    - Cleanup script - script invoked via cron to implement the cleanup strategy created using the PDS Cleanup Manager
    - Oracle database server - manages PDS order and job data for both PDSIS and PDSSA

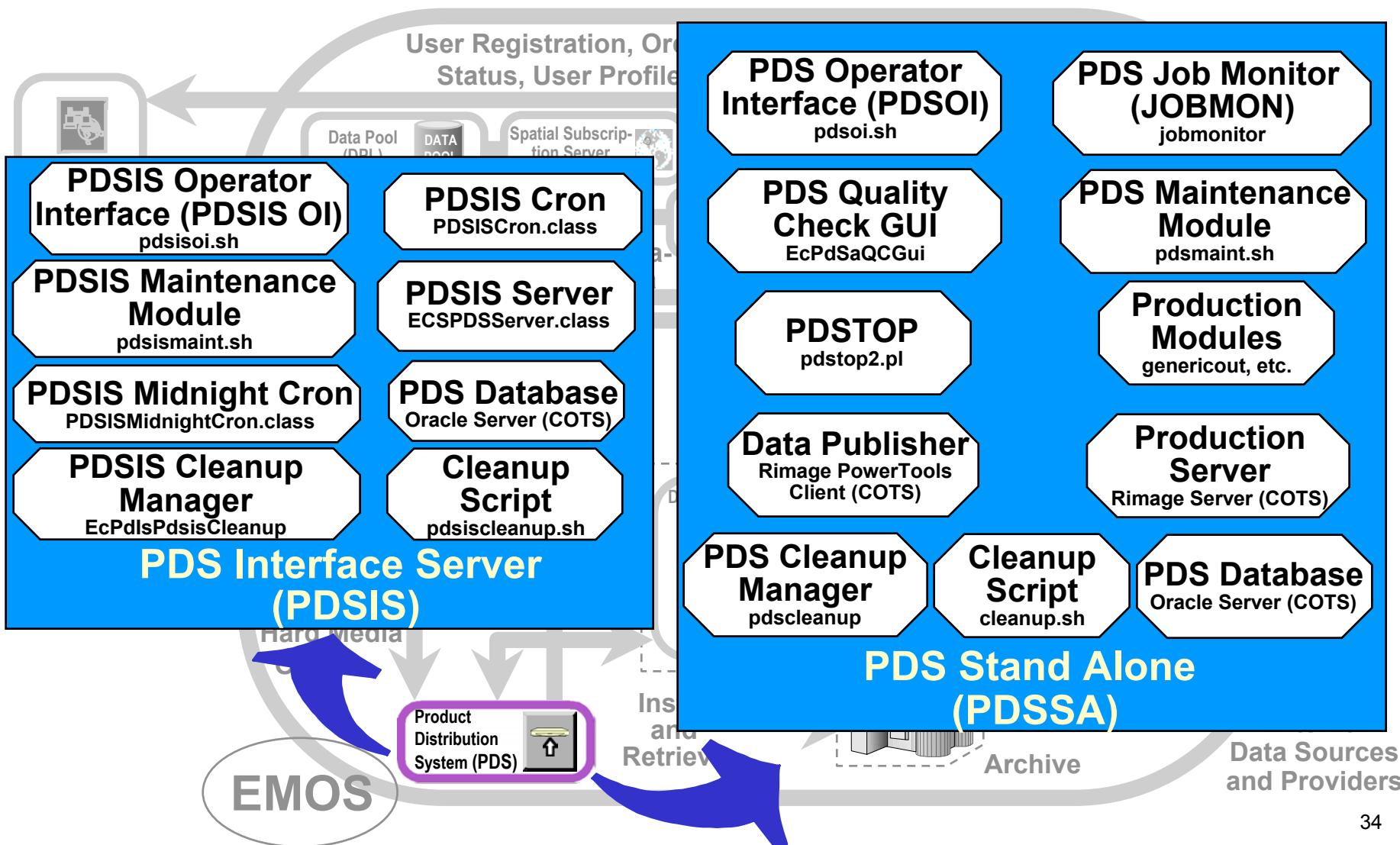
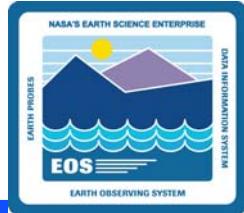
# Subsystems and CSCIs: PDS (Cont.)

## PDSSA Architecture and Interfaces

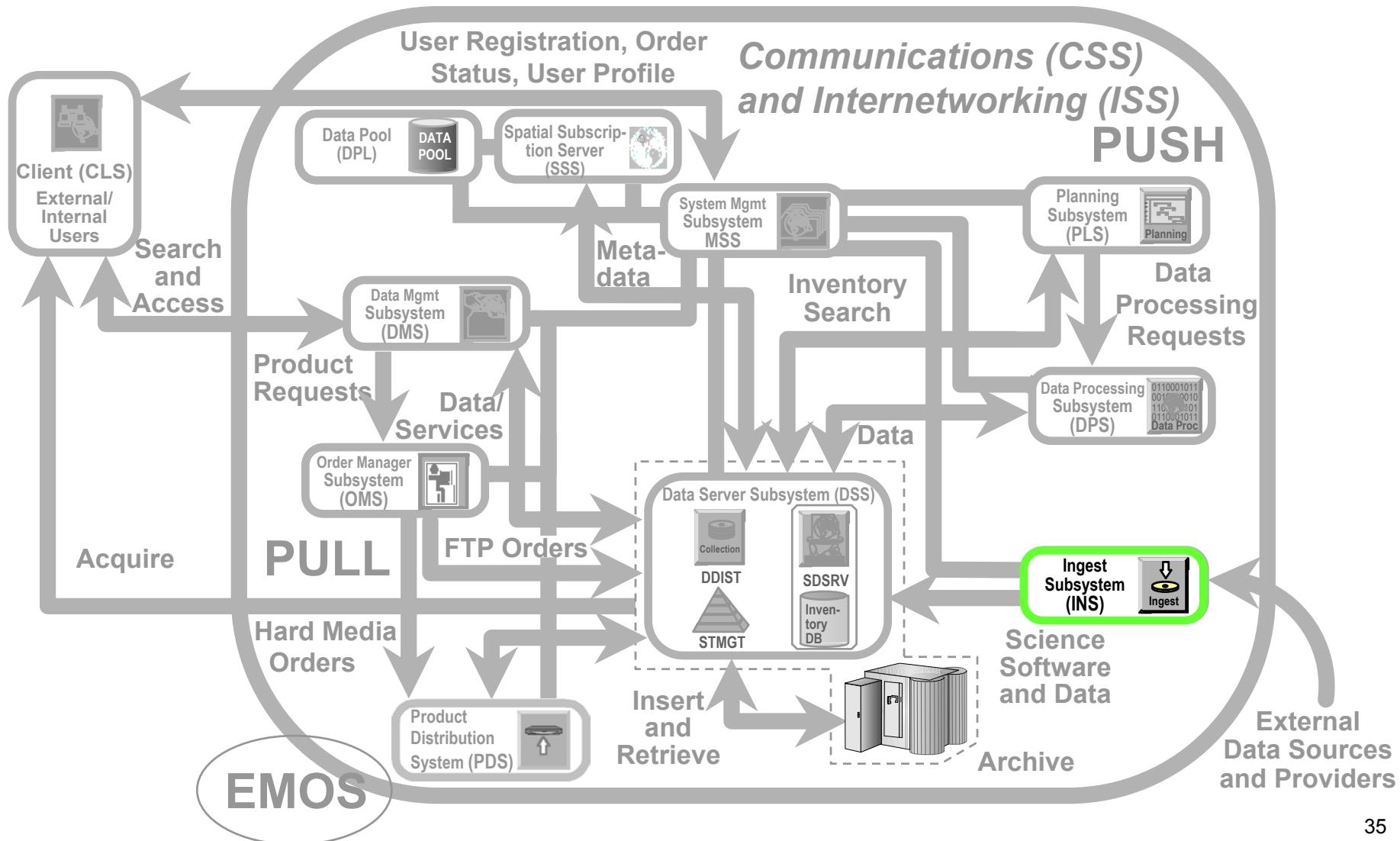
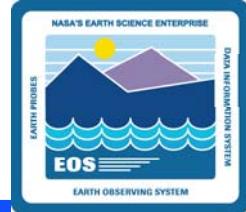


**PDS**

# Subsystems and CSCIs: PDS



# Subsystems and CSCIs: INS





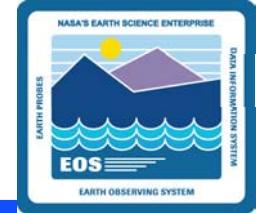
# Subsystems and CSCIs: INS

- **Ingest Subsystem (INS)**



- Transfer of data into ECS (SDPS repositories) in accordance with approved ICDs
- Supports varied data formats and structures
- *Ingest Client*: A set of ingest software configured for requirements of a specific situation
- Ingest clients perform data preprocessing, such as format conversion, metadata extraction (including Landsat scene/browse derivation), and metadata validation on incoming data
- Data staged to one of two areas
  - Level 0 (L0) data from ongoing missions, and EDOS ancillary data, staged to INS working storage area
  - Non-L0 data (e.g., non-EDOS ancillary data, L1A-L4 data) staged directly to DSS working storage area
- Uses several COTS tools: RogueWave class libraries, Sybase relational database, CCS Middleware Client

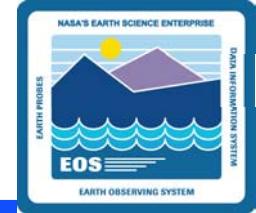
# Subsystems and CSCIs: INS (Cont.)



- **Ingest (INGST) CSCI**
  - Gets data by various methods and transfers the data into ECS
    - Polling: transfer of data from predetermined network locations which Ingest periodically checks for new data
      - With Delivery Record
      - Without Delivery Record
    - Media: reading data from physical media; uses GUI
    - Cross-Mode Ingest: E-mail distribution notification used to create a Delivery Record File for Polling with Delivery Record
  - Stores and manages request information
  - Provides for data preprocessing and insertion



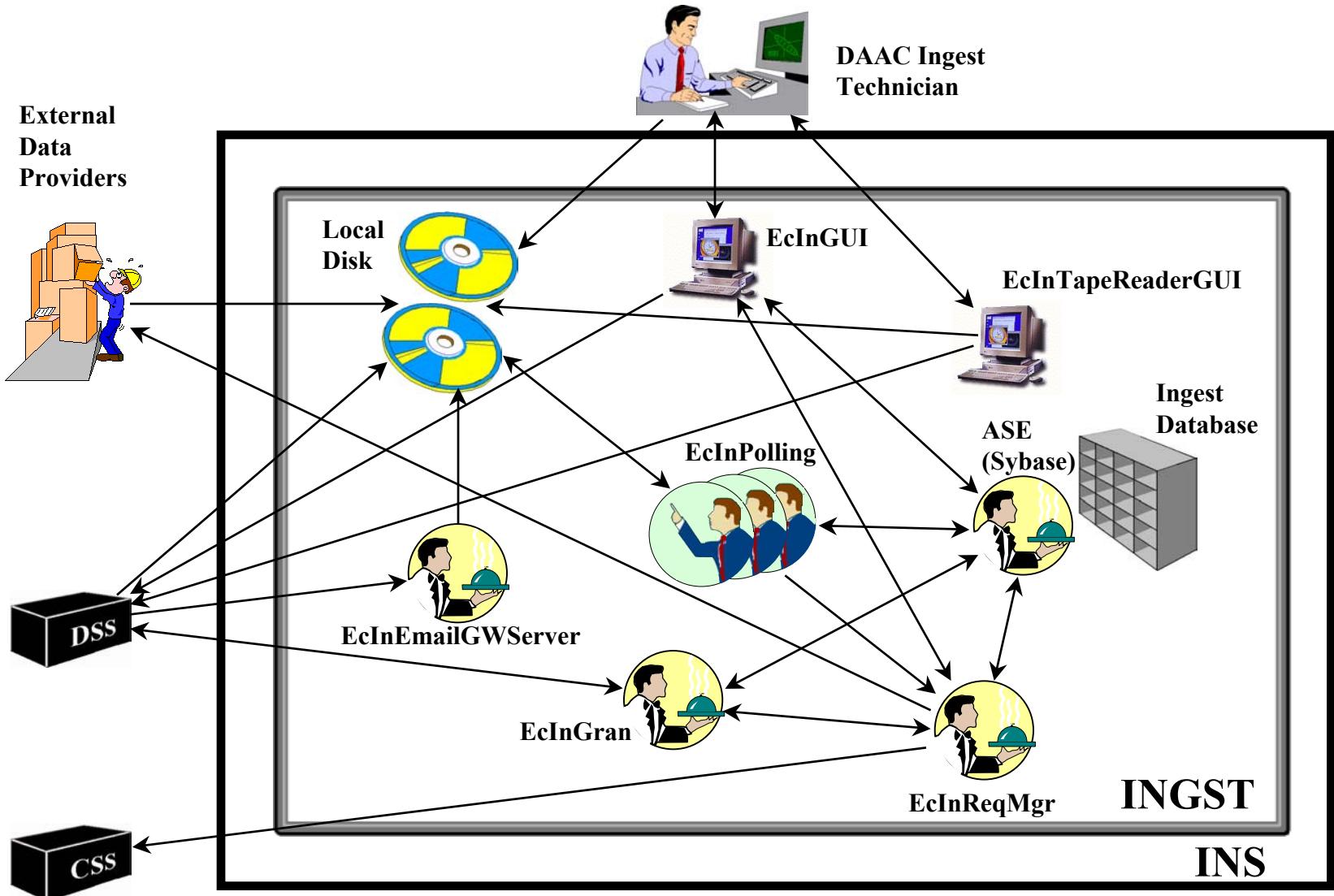
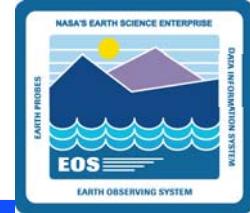
# Subsystems and CSCIs: NS (Cont.)



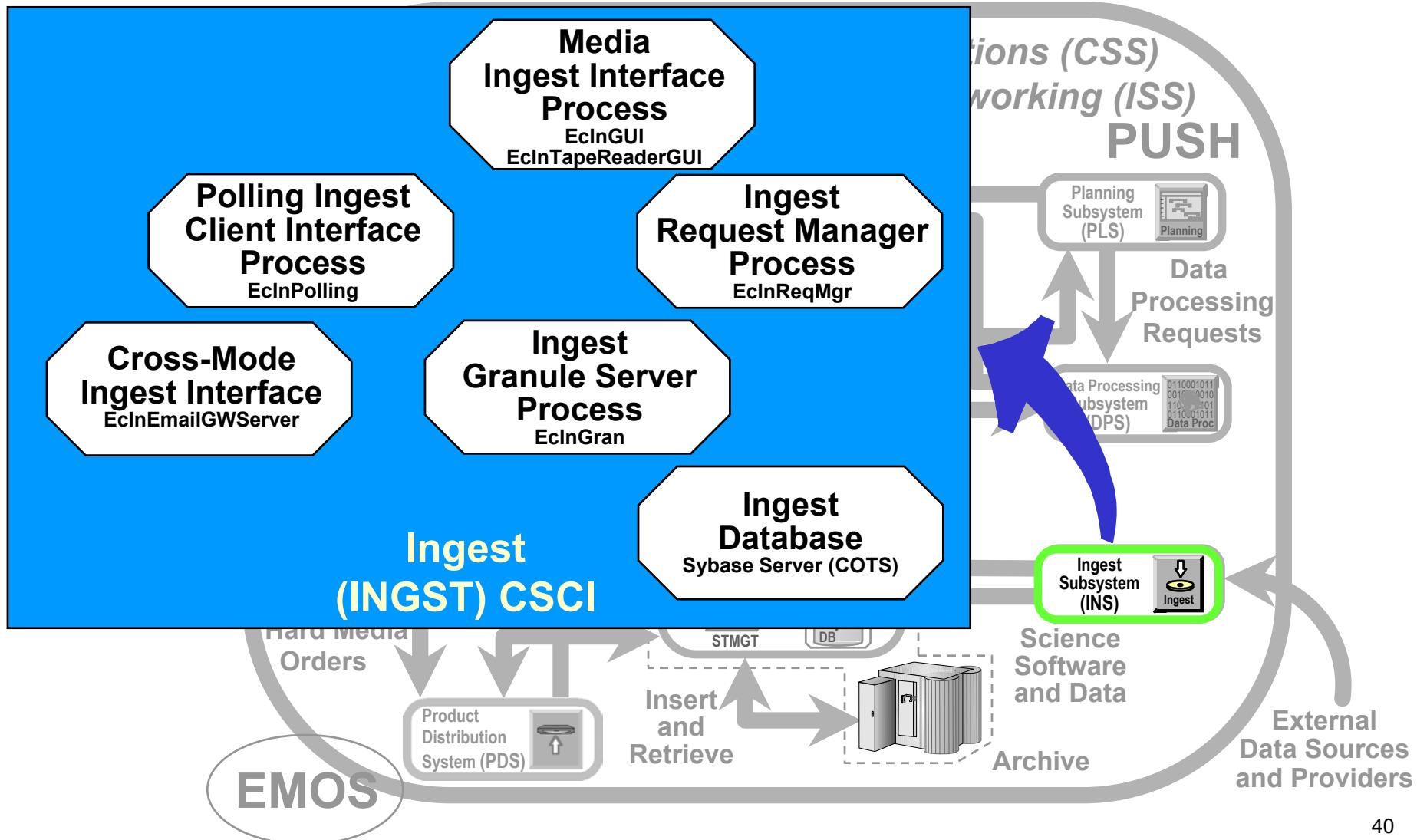
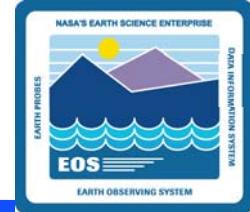
- **Ingest (INGST) CSCI (Cont.)**
  - Six major components
    - **Polling Ingest Client Interface** - creates polling request, detects new files in a specified external location, creates and submits ingest request
    - **Media Ingest Interface** - provides operators ability to perform ingest from physical media
    - **Cross-Mode Ingest Interface** - provides an E-mail gateway server to receive E-mail distribution notifications and store them as files in a location for polling with delivery record
    - **Ingest Request Manager** - manages ingest request traffic and processing
    - **Ingest Granule Server** - provides services for required preprocessing of data and subsequent insertion into Data Server
    - **Ingest Database** - stores and provides access to Ingest Subsystem internal data (e.g., Request Status, History Logs)

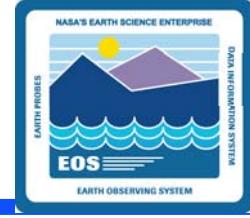
# Subsystems and CSCIs: INS (Cont.)

## Architecture and Interfaces



# Subsystems and CSCIs: INS (Cont.)

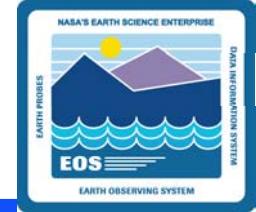




# Subsystems and CSCIs: SSS

Spatial Subscription Server (sss) 

- **Spatial Subscription Server (SSS)**
  - Creating, viewing, updating Subscriptions (specification of an action and an event that initiates the action)
    - Actions: Notification, Distribution, Data Pool Insert
    - Events: Granule Insert, Granule Deletion, Metadata Update
  - Creating, viewing, deleting Bundling Orders (specification of distribution packages and criteria for package completion)
    - Minimum bundle size
    - Minimum granule count
    - Maximum bundle age
    - Bundling order information stored in Order Manager database
- **Subscription processing triggered by appearance of events in Science Data Server database**
  - Identify all subscriptions to the specified event
  - Process the actions defined in the subscriptions
- **Uses several COTS tools: Netscape Navigator, Sun ONE Web Server, Sybase ASE**

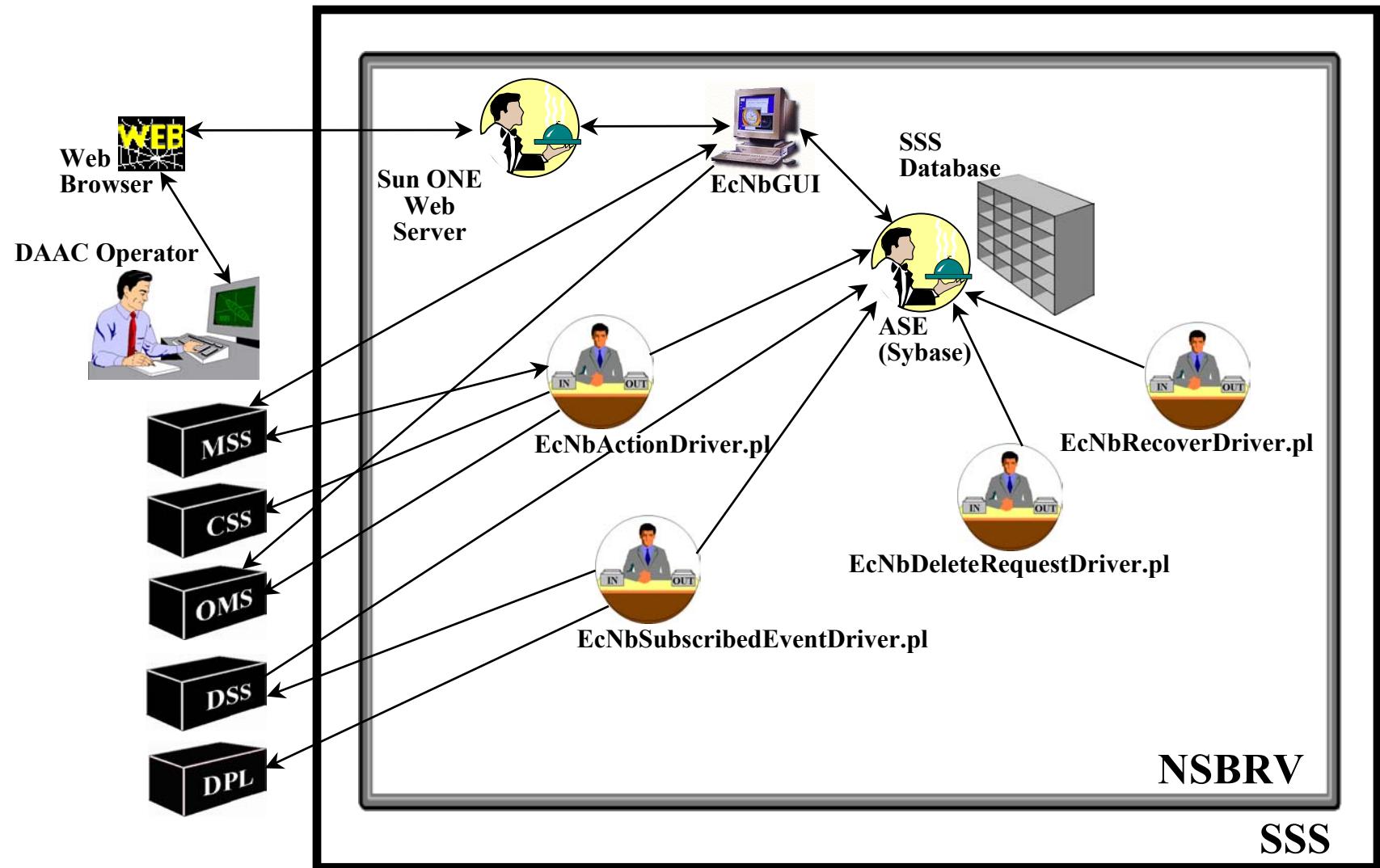


# Subsystems and CSCIs: SSS (Cont.)

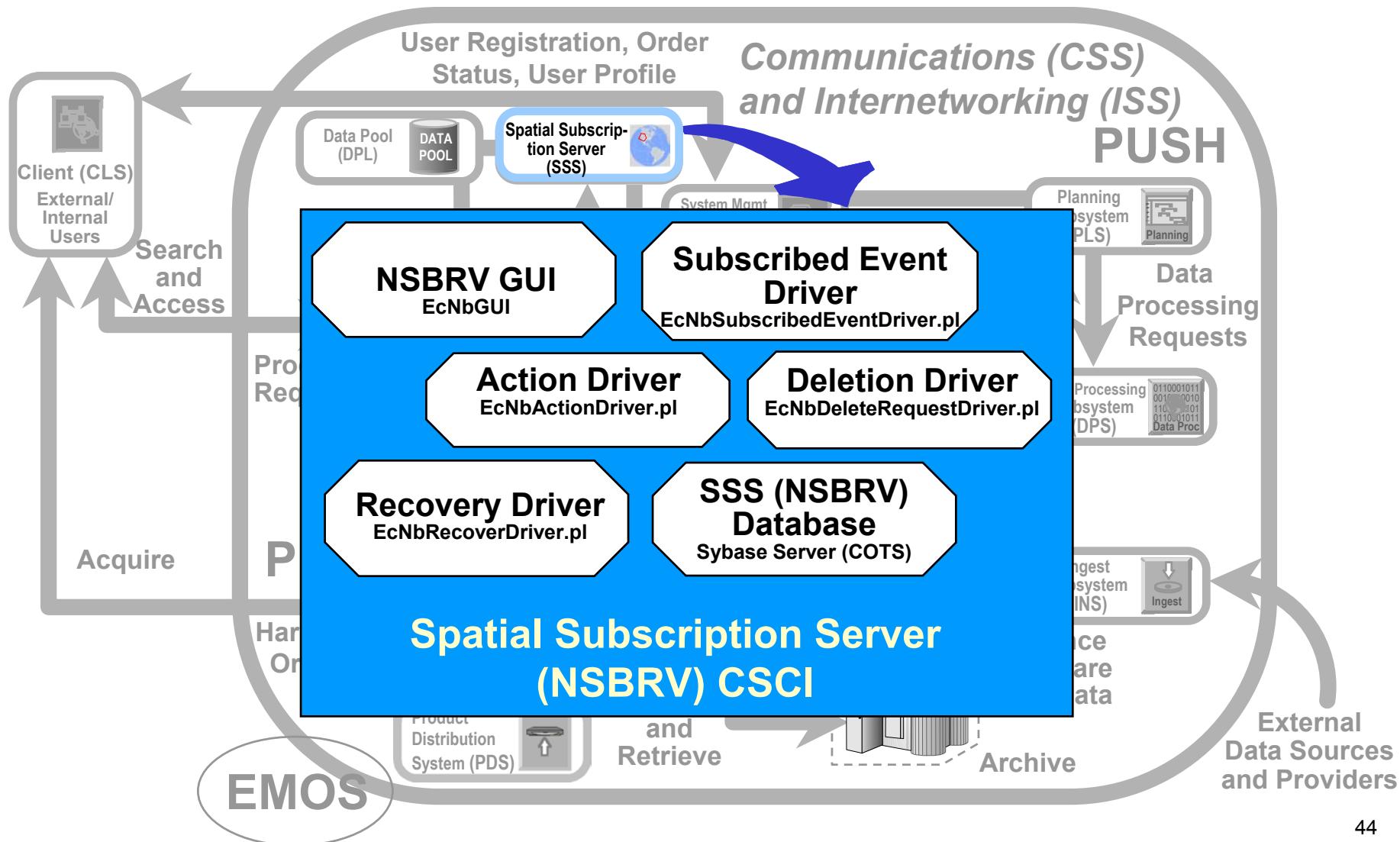
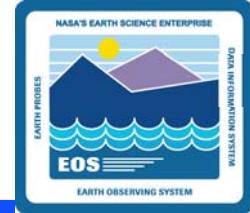
- **Spatial Subscription Server (NSBRV) CSCI**
  - Provides a Graphical User Interface (GUI) and a set of drivers for implementing subscription functions
  - Six major components
    - **Spatial Subscription Server database** - repository for all data created expressly for use by the NSBRV
    - **Subscription GUI** - tool for entering, modifying, or deleting subscriptions and bundling orders
    - **Event Queue Monitor** - multiple instances of a Perl script that monitors the event queue for new arrivals
    - **Action Queue Monitor** - multiple instances of a Perl script that monitors the action queue for new arrivals
    - **Recovery Driver** - Monitors logs for stalled events or actions; re-enqueues stalled events/actions
    - **Deletion Driver** - Works off a deletion queue to purge the database of outdated information (e.g., completed events/actions)

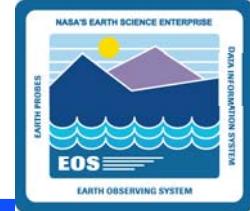
# Subsystems and CSCIs: SSS (Cont.)

## NSBRV Architecture and Interfaces



# Subsystems and CSCIs: SSS (Cont.)

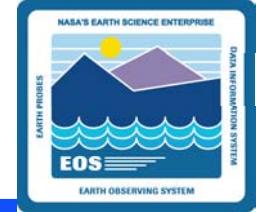




# Subsystems and CSCIs: DPL

Data Pool  
(DPL)      DATA  
POOL

- **Data Pool (DPL)**
  - An on-line repository of selected granules with associated metadata and, if available, browse granules
  - Accessible through a web browser
  - Accessible through FTP
  - Data downloadable via FTP
- Provides easy-to-use drill-down web user interface
- Included in EDG data search results
- Populated by subscriptions for Data Pool insert
- Uses several COTS tools: Netscape Navigator, Sun ONE Web Server, Apache Web Server, wuftp (COTS FTP Server), Sybase ASE

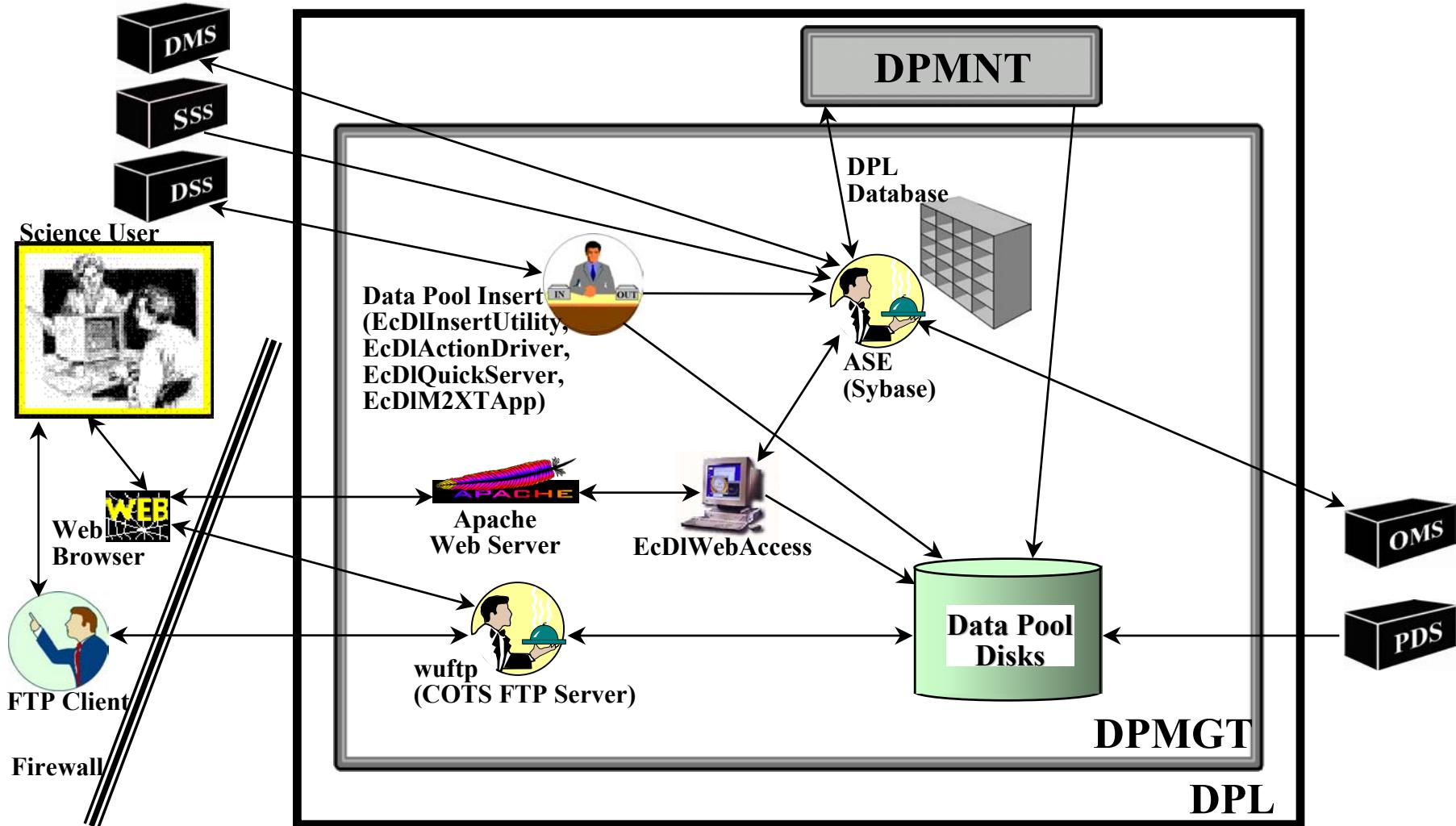


# Subsystems and CSCIs: DPL (Cont.)

- **Data Pool Management (DPMGT) CSCI**
  - Provides on-line cache for access to selected ECS data, metadata, and browse granules
  - Permits user search and FTP download through a web interface
  - Permits user browsing and download during an FTP session
  - Provides an Insert Utility for insert of data and metadata
  - Four major components
    - **Data Pool Insert Utility** - consists of four subcomponents
      - Action Driver schedules insert actions
      - Insert Utility requests copy to the Data Pool and updates the inventory
      - Quick Server, a C++ executable, performs the copy from AMASS
      - EcDIM2XT, a java executable, translates granule metadata into XML format
    - **Data Pool Web Access** - provides easy drill-down search and FTP download for the user
    - **wuftp** - COTS FTP server for user-interactive FTP sessions
    - **Data Pool Database** - Sybase database stores Data Pool inventory and configuration information

# Subsystems and CSCIs: DPL (Cont.)

## DPMGT Architecture and Interfaces



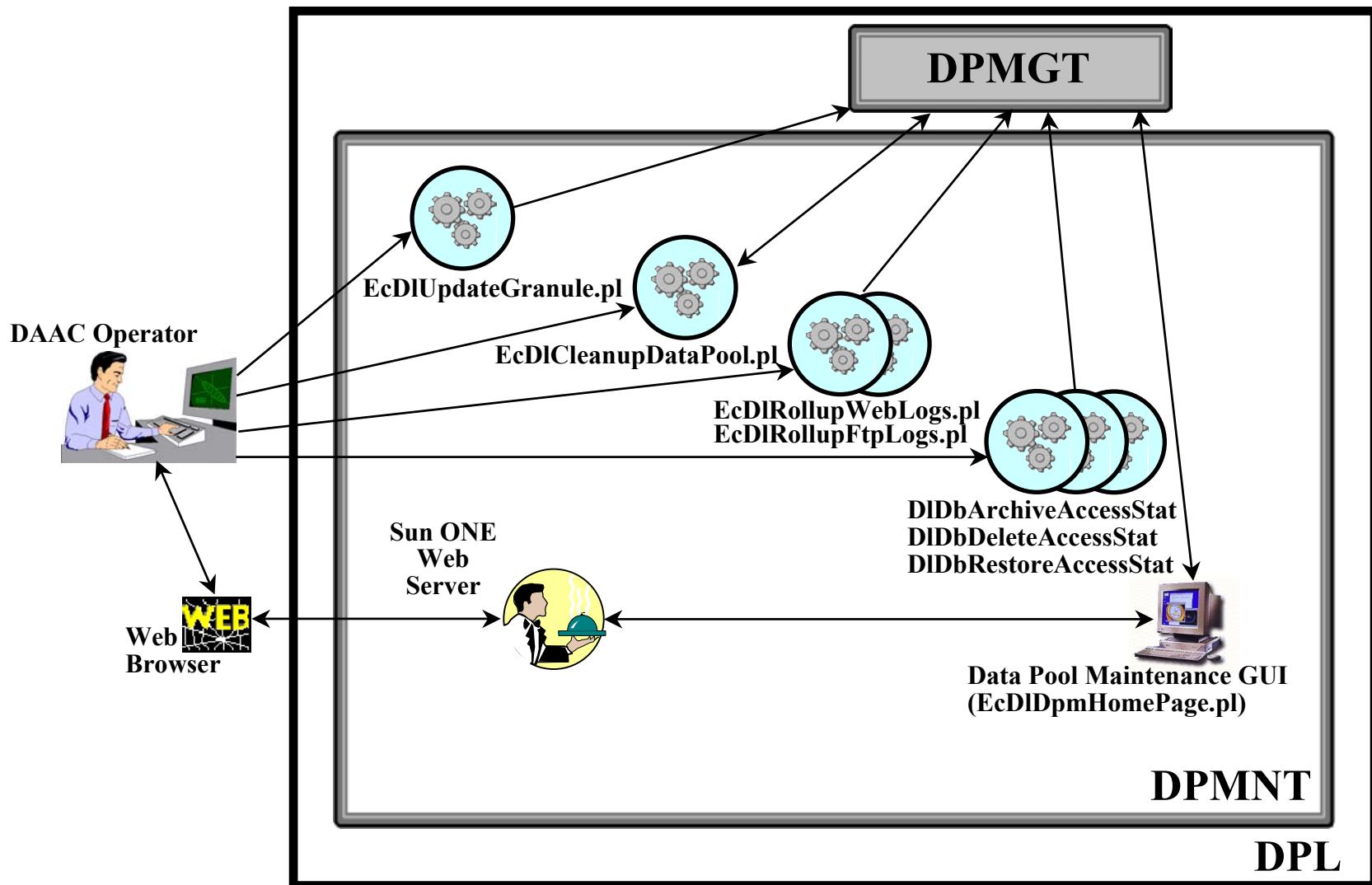
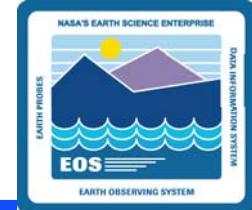


# Subsystems and CSCIs: DPL (Cont.)

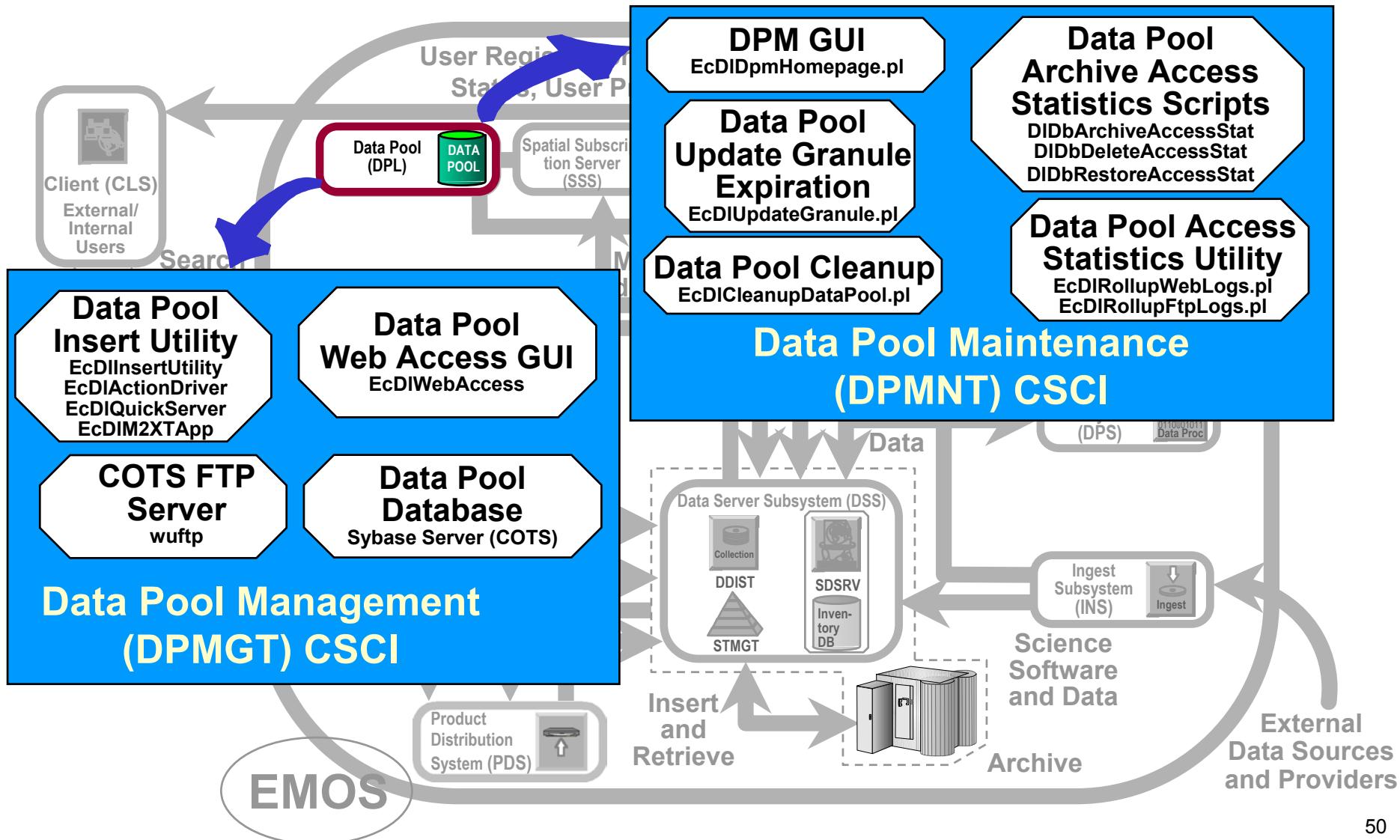
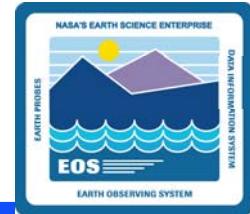
- **Data Pool Maintenance (DPMNT) CSCI**
  - Provides a maintenance GUI that allows operators to monitor and control Data Pool insert activity and control the Data Pool configuration
  - Provides utilities and scripts for Data Pool maintenance
  - Five major components
    - **Data Pool Maintenance (DPM) GUI** - a Perl web-based GUI for Data Pool monitoring and control
    - **Update Granule Expiration Utility** - a Perl utility that allows updating the expiration date and retention priority for granules in the Data Pool
    - **Data Pool Cleanup** - a Perl utility that removes expired granules from the Data Pool and database (normally run as a cron job)
    - **Data Pool Access Statistics Utility (DPASU)** - Perl utilities that extract access statistics from logs and roll up access information for storage in the Data Pool database
    - **Data Pool Archive/Delete/Restore Access Statistics** - shell scripts to manage access statistics

# Subsystems and CSCIs: DPL (Cont.)

## DPMNT Architecture and Interfaces



# Subsystems and CSCIs: DPL (Cont.)



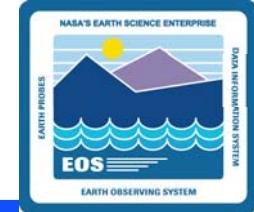


# Subsystems and CSCIs: CLS

- **Client Subsystem (CLS)**
  - User access to ECS services for ASTER
    - Permits Data Acquisition Request to task ASTER instrument
    - Supports request of ASTER On-demand Products (not used)
  - Provides user authentication and User Profile information to the Search and Order tool
    - Search and retrieval of data are performed by the EOS Data Gateway (Version 0 Web Client)
  - Includes applications programs accessible through user interfaces
    - EOSView
    - ASTER Data Acquisition Request (DAR) Tool
    - On-Demand Form Request Manager (ODFRM) (not used)
  - Uses several COTS tools: Netscape Navigator, Netscape Enterprise Server, XVT (widget set and development tool for EOSView), and Interactive Data Language (IDL) (used in EOSView visualization features)



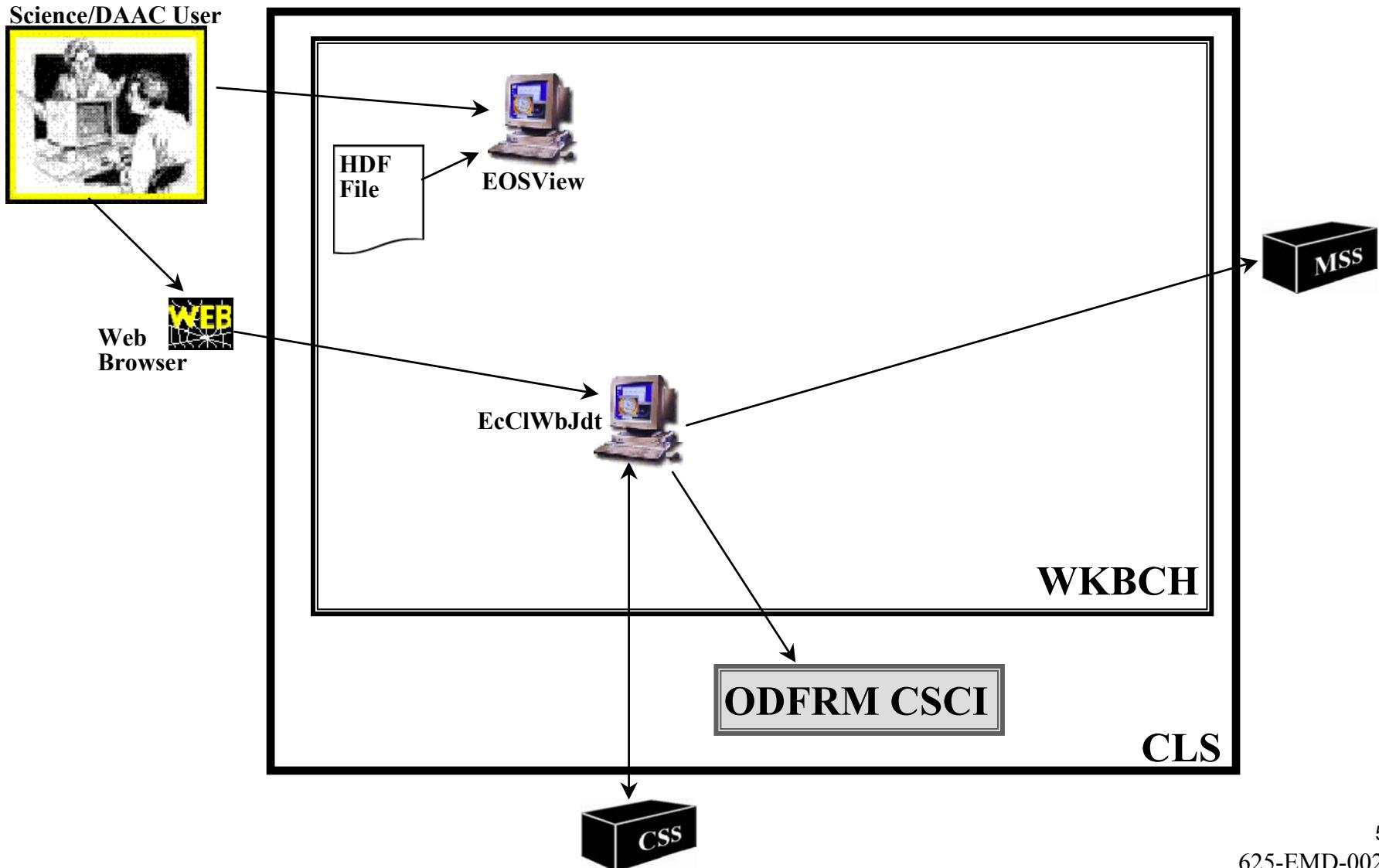
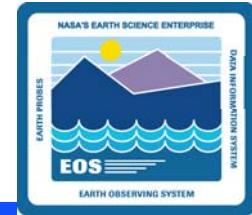
# Subsystems and CSCIs: CLS (Cont.)



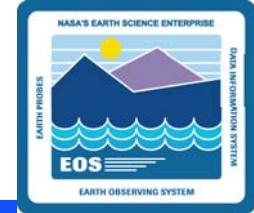
- **Workbench (WKBCH) CSCI**
  - Includes a set of application programs that implement functions of the CLS science user interface
  - Release 7 Workbench includes 2 tools
    - [EOSView](#) (X/Motif-based)
    - [ASTER DAR Tool](#) (Java/HTML-based)

# Subsystems and CSCIs: CLS (Cont.)

## WKBCH Architecture and Interfaces



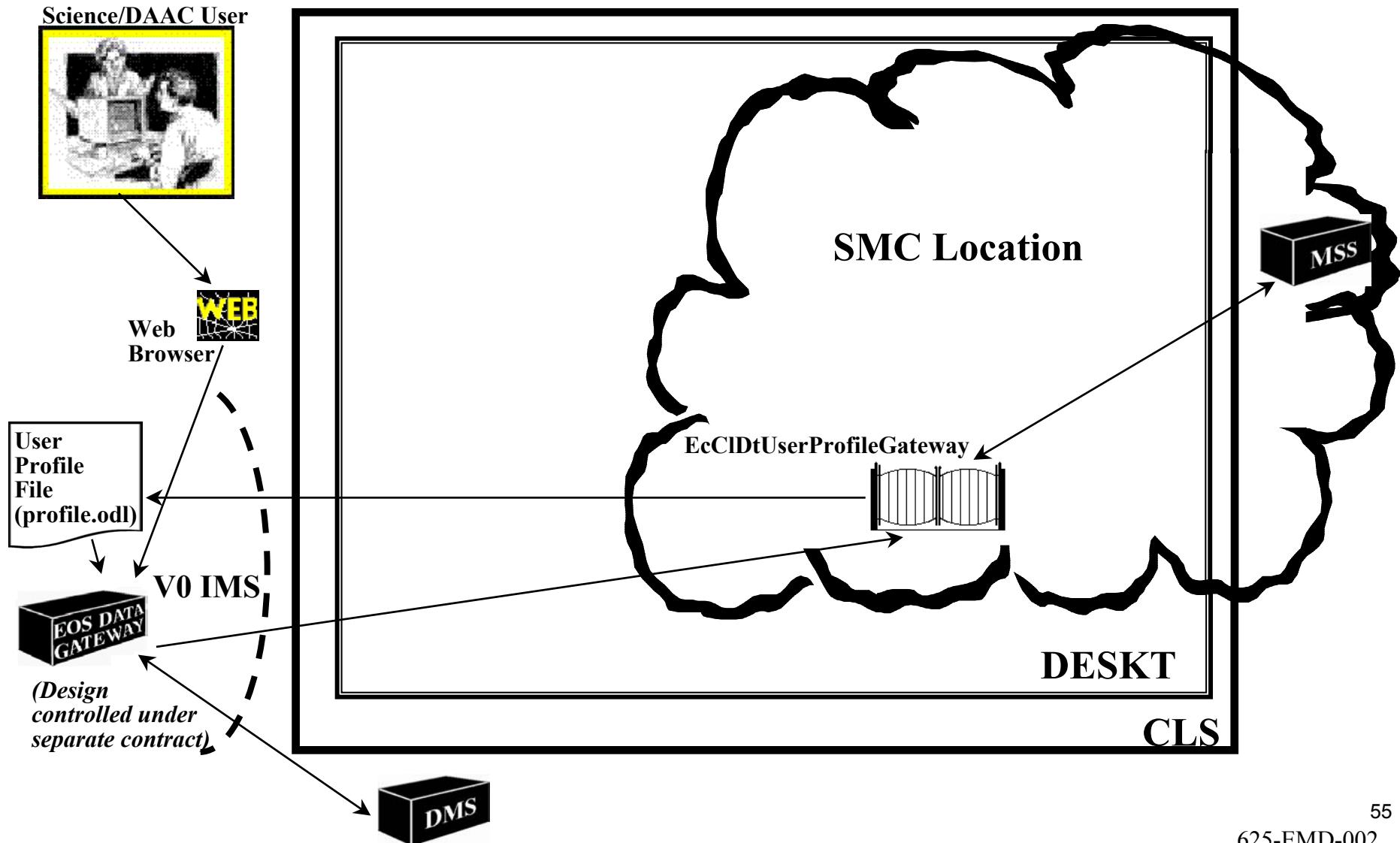
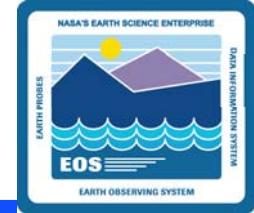
# Subsystems and CSCIs: CLS (Cont.)

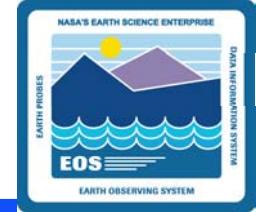


- **Desktop (DESKT) CSCI**
  - Provides a gateway server for communication with MSS User Registration Server to support seamless user registration through the EOS Data Gateway (EDG) web client and to obtain or update user profile information
  - **User Profile Gateway** - provides user profile information to the EDG for ECS users
    - User authentication
    - Submit/Update user information in profile

# Subsystems and CSCIs: CLS (Cont.)

## DESKT Architecture and Interfaces





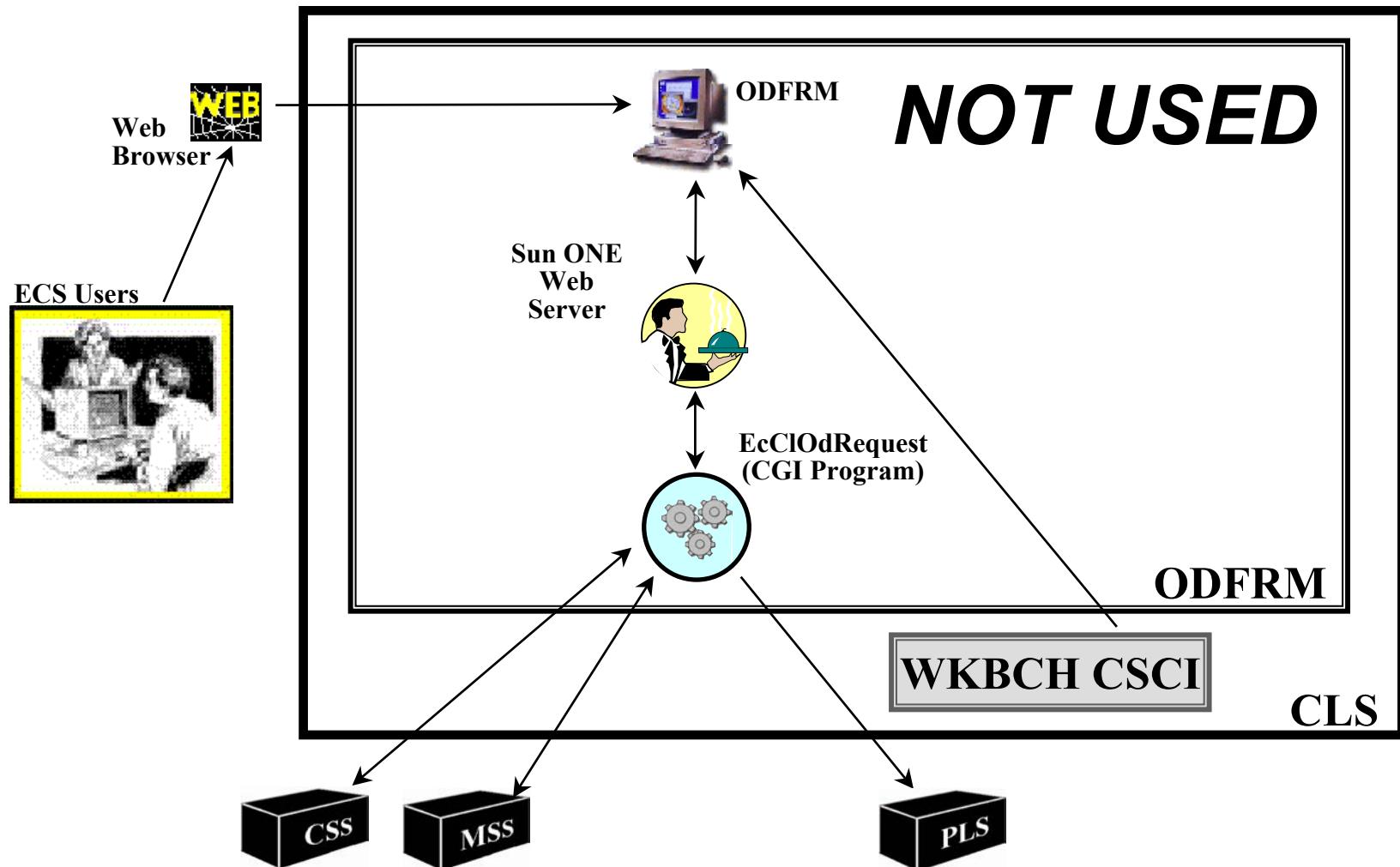
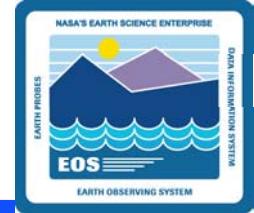
# Subsystems and CSCIs: CLS (Cont.)

- **On-Demand Form Request Manager (ODFRM) CSCI**
  - Supports attachment of a Data Processing Request (DPR) to an ASTER Data Acquisition Request (a required capability that is not used)
  - **ODFRM** HTML pages and Common Gateway Interface (CGI) programs
  - Creation of an on-demand processing request and its submission to the Planning Subsystem (PLS) is now done through the EOS Data Gateway (EDG) tool
  - ASTER on-demand products
    - ASTER L1B\*
    - ASTER DEM (Digital Elevation Model)\*
    - ASTER higher-level products (AST\_04, AST\_05, AST\_06V, AST\_06T, AST\_06S, AST\_07S, AST\_07V, AST\_09T, AST\_09V, AST\_09S, AST\_08)

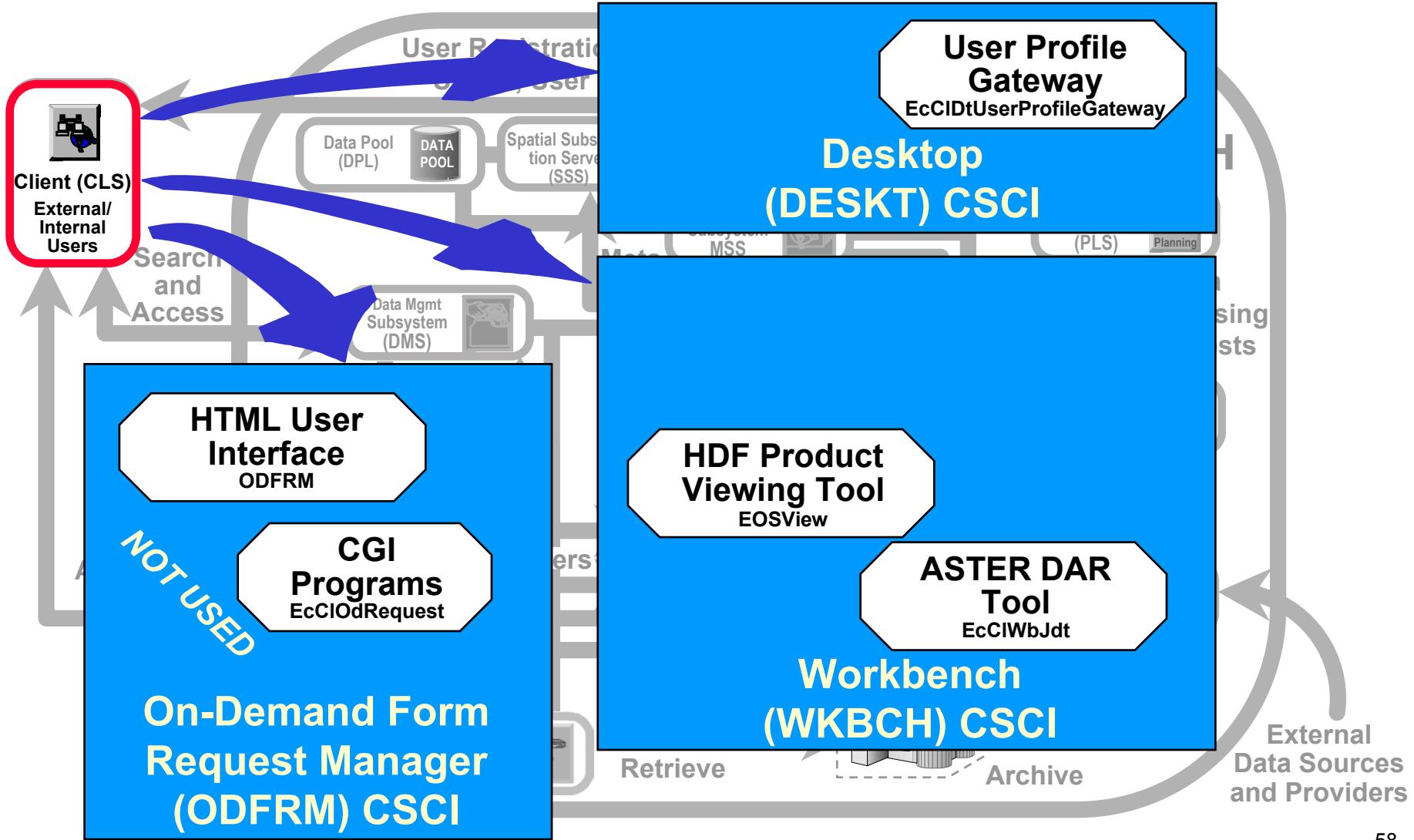
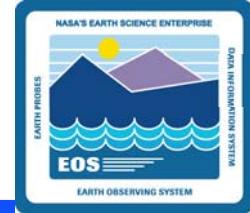
\* Note: Requires special privilege (in User Profile) to use ODFRM to order this product

# Subsystems and CSCIs: CLS (Cont.)

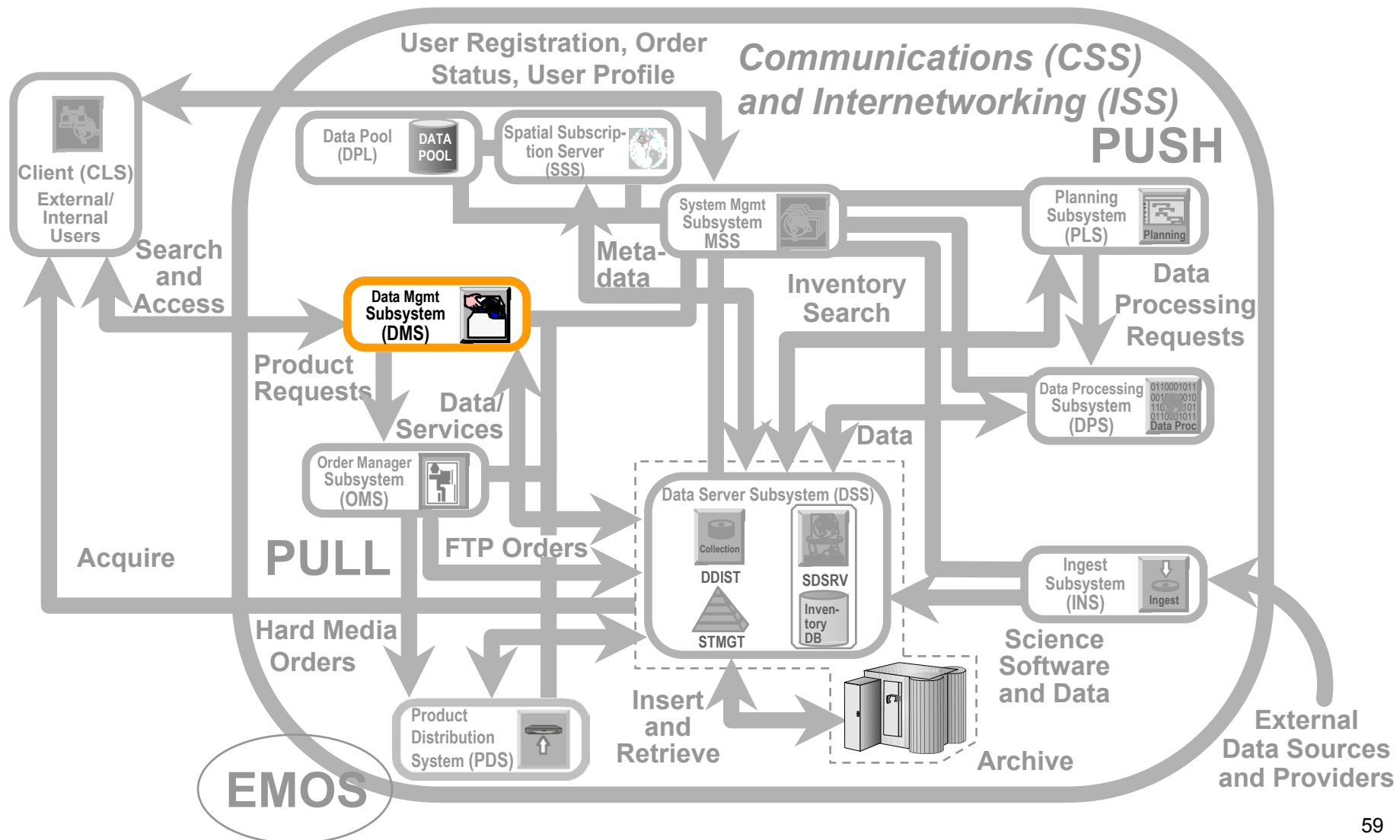
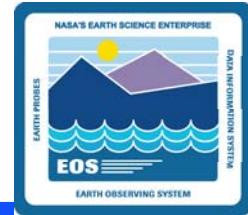
## ODFRM Architecture and Interfaces



# Subsystems and CSCIs: CLS (Cont.)



# Subsystems and CSCIs: DMS



# Subsystems and CSCIs: DMS



- **Data Management Subsystem (DMS)**
  - Provides one-way catalog interoperability between ECS and the V0 Information Management System (IMS)
  - Supplies gateway processes to translate requests between V0 protocol and ECS
  - Maintains a Data Dictionary that stores ECS data collection information (i.e., collection metadata, attributes, valid keywords) and mappings between this information and V0 to permit translation of requests between the systems
  - Uses several COTS tools: RogueWave class libraries, Builder Xcessory (GUI builder tool), and Sybase ASE Server (for Data Dictionary database search and update)



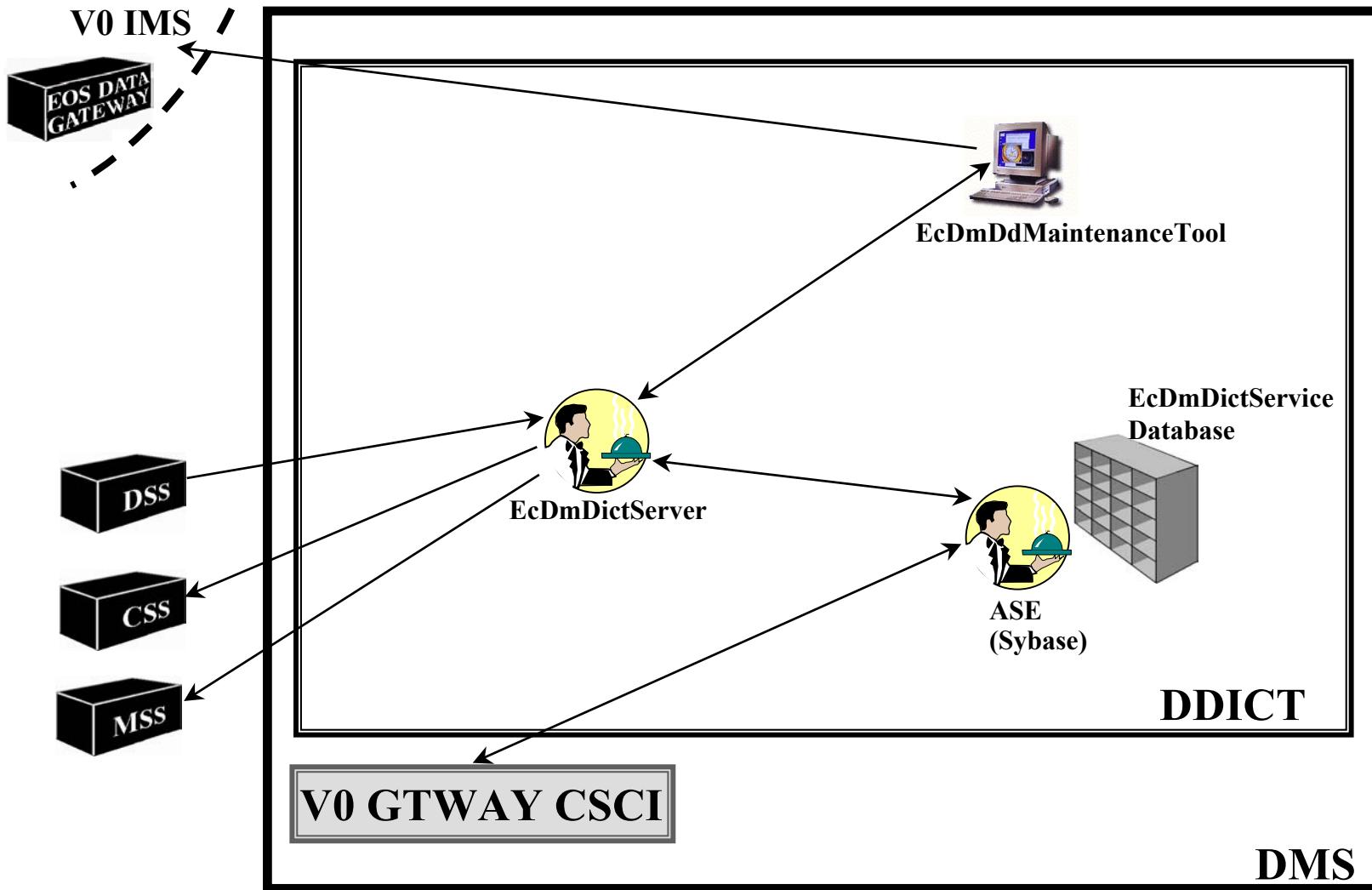


# Subsystems and CSCIs: DMS (Cont.)

- **Data Dictionary (DDICT) CSCI**
  - Manages definitions of data collections including metadata, data domains (valid values), and data location
  - Stored in a relational Database Management System (DBMS)
  - Three major components
    - **Data Dictionary Server** - provides DDICT client processes the ability to perform data searches, inserts, updates, or deletes to the DDICT database
    - **Data Dictionary Maintenance Tool** - provides a GUI to insert, update, or delete schema information held in the DDICT database, and allows operations staff to modify database attributes (e.g., valids, mapping)
    - **Data Dictionary ASE Server** - COTS database server

# Subsystems and CSCIs: DMS (Cont.)

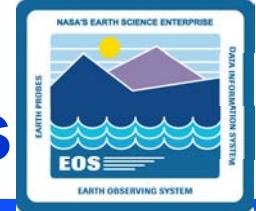
## DDICT Architecture and Interfaces





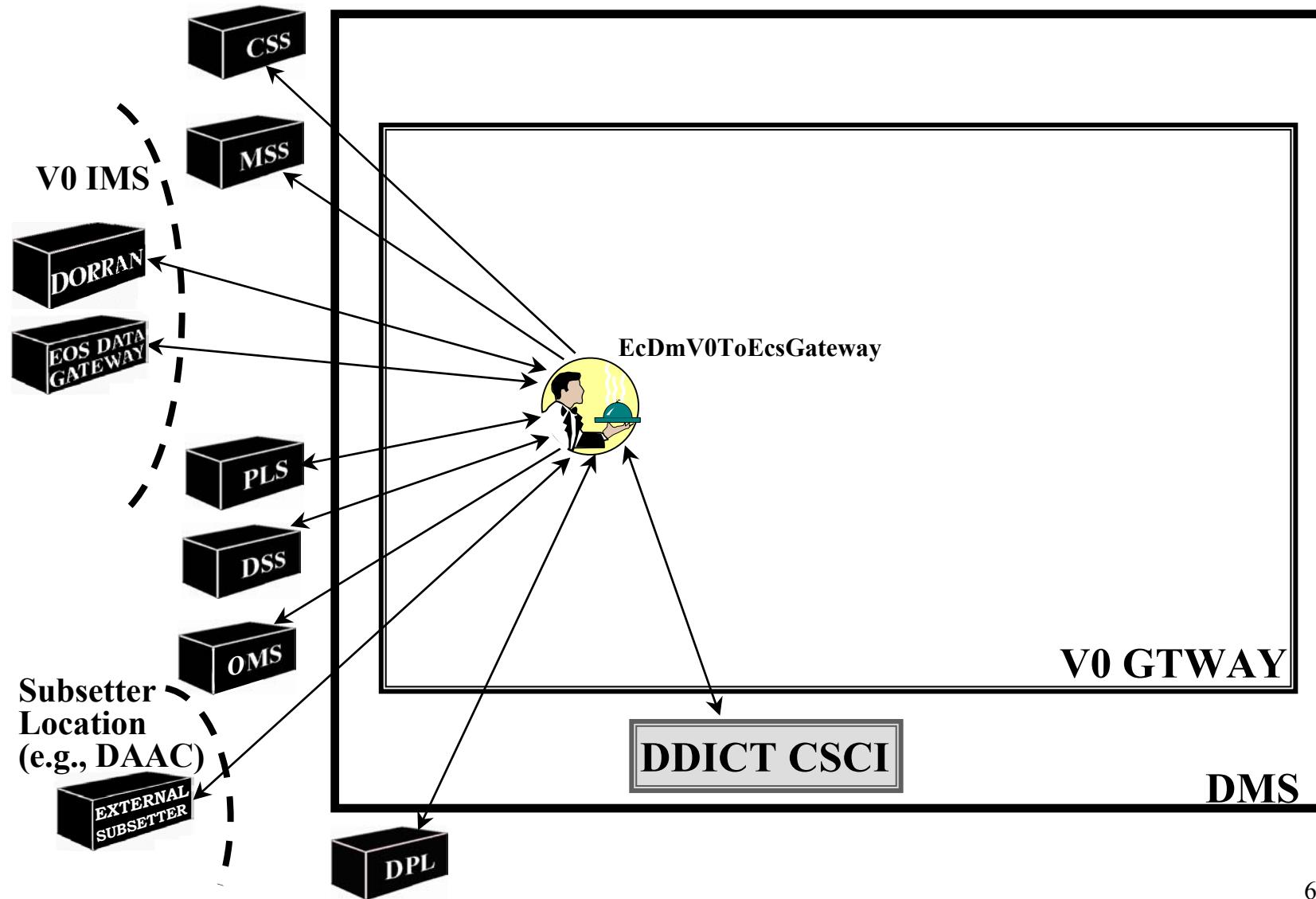
# Subsystems and CSCIs: DMS (Cont.)

- **Version Zero Gateway (V0 GTWAY) CSCI**
  - Provides one-way interoperability with the V0 Information Management System (IMS) for inventory searches, browse requests, product orders, and price estimate requests; search results include links to URLs for Data Pool products
  - At EDC, transmits ASTER product requests to the V0 IMS to allow billing by the billing and accounting system
    - Distributed Ordering, Reporting, Researching, and Accounting Network (DORRAN)
  - Queries between V0 IMS and the ECS V0 GTWAY use the Object Description Language (ODL) format
  - One component
    - **V0 to ECS Gateway Server** - allows use of the EOS Data Gateway Web Client to search and request data and services defined within ECS

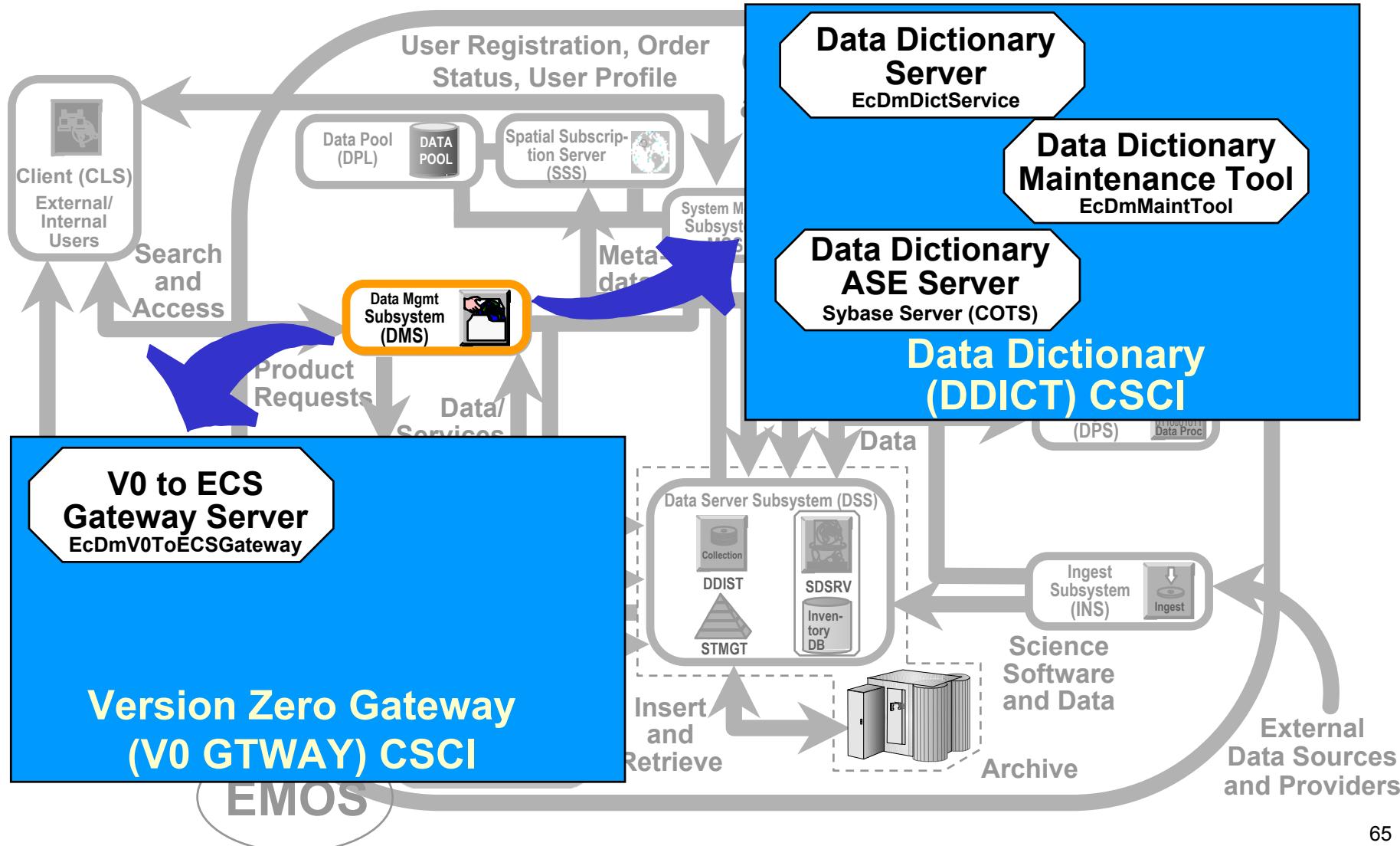
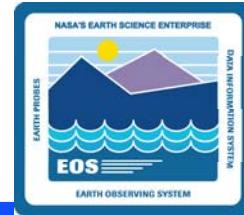


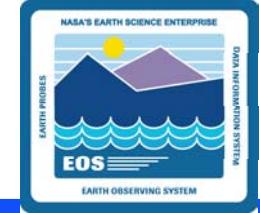
# Subsystems and CSCIs: DMS (Cont.)

## V0 GTWAY Architecture and Interfaces



# Subsystems and CSCIs: DMS (Cont.)





# Subsystems and CSCIs: OMS

- **Order Manager Subsystem (OMS)**
  - Manages orders arriving via the following routes:
    - DMS V0 Gateway (i.e., from EDG, ECHO, and GDS users)
    - Spatial Subscription Server (NSBRV)
    - CSS Machine-to-Machine Gateway
    - Media orders from the Data Pool Web Access GUI
  - Provides an Order Manager Server that receives the data distribution orders and forwards them to the appropriate ECS services
    - Orders for electronic distribution either filled from the Data Pool or sent to SDSRV (as appropriate)
    - Orders for media distribution sent to PDS
  - Provides a Graphical User Interface (GUI) for monitoring and controlling Order Manager operations
  - Uses several COTS tools: RogueWave class libraries, Sybase Open Client, Sybase ASE Server

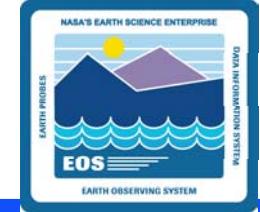
Order Manager  
Subsystem  
(OMS)



# Subsystems and CSCIs: OMS (Cont.)



- **Order Manager Server (OMSRV) CSCI**
  - Receives Product Distribution Requests from the various sources
  - Immediately stores request information in a relational Database Management System (DBMS)
  - Validates the requests for correctness (e.g., request size, media capacity, accessibility, validity of UR)
  - Fills valid electronic distribution requests from DPL or submits valid requests to SDSRV or PDS (as appropriate)
  - Generates Operator Interventions for invalid requests



# Subsystems and CSCIs: OMS (Cont.)

- Order Manager Server (OMSRV) CSCI (Cont.)
  - Three major components
    - Order Manager Server - interacts with the Order Manager Database, Order Manager Ftp Push Server, Data Pool, Product Distribution System, and Science Data Server
    - Order Manager FTP Push Server (EcOmFtpPush) - Executable that performs pushes of distribution requests from the Data Pool
    - Order Manager ASE Server - COTS database server

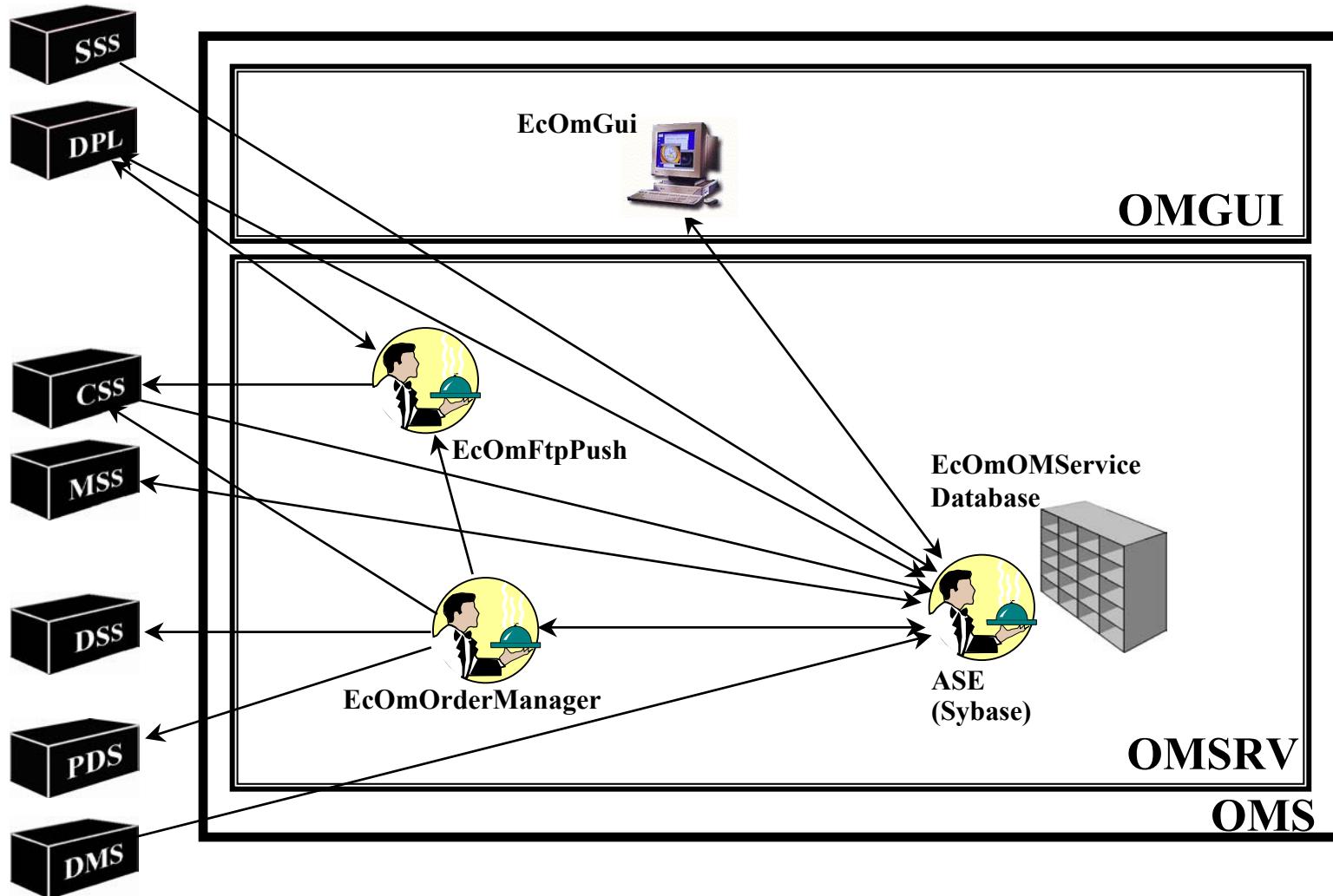
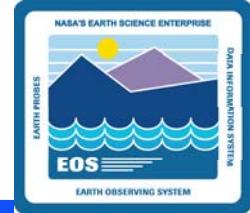


# Subsystems and CSCIs: OMS (Cont.)

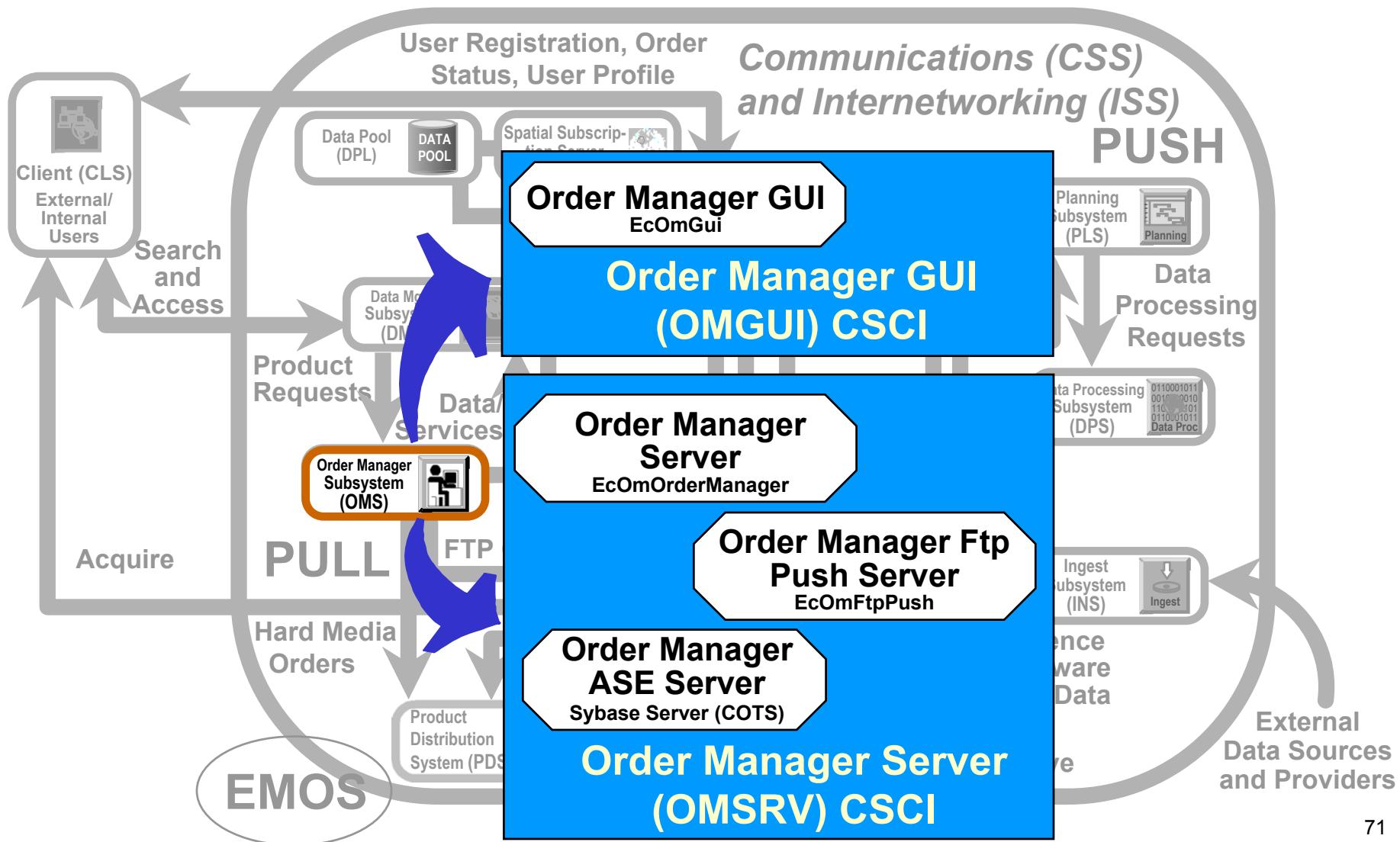
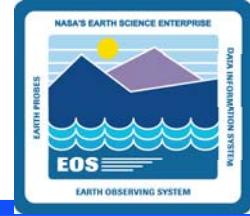
- **Order Manager GUI (OMGUI) CSCI**
  - Based on web standards
  - Communicates directly with the Order Manager Service database (not through a server)
  - Permits monitoring and control of the OMSRV (e.g., view operator alerts, view status of queues, suspend and resume queues, view and modify configuration parameters, monitor statistics)
  - Monitor open Operator Interventions for invalid requests; manage interventions; view closed interventions; view, cancel, suspend, resume, or resubmit distribution requests; view order information and user profile data; view, update, or cancel bundling orders
  - One major component
    - **Order Manager GUI** - interacts with the Order Manager Database

# Subsystems and CSCIs: OMS (Cont.)

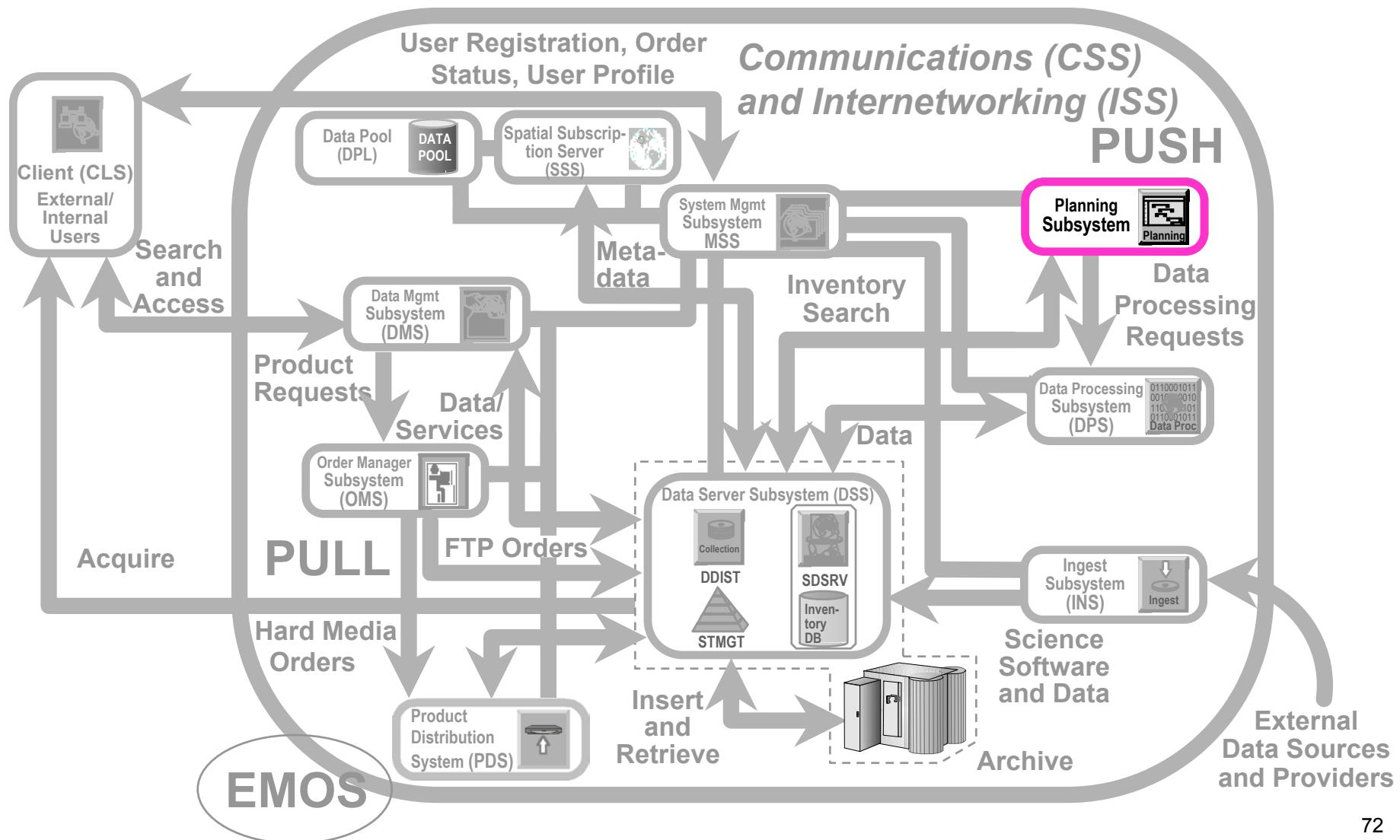
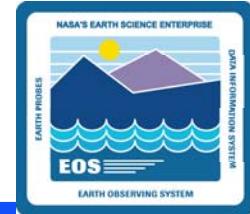
## OMS Architecture and Interfaces



# Subsystems and CSCIs: OMS (Cont.)



# Subsystems and CSCIs: PLS



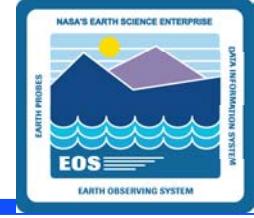


# Subsystems and CSCIs: PLS

- **Planning Subsystem (PLS)**



- Allows operations staff to define data processing tasks to be performed at a site
- Generates efficient plans for scheduling defined data processing and reprocessing tasks according to production rules that define how a Product Generation Executive (PGE) is to run
- Coordinates production with the Data Server and Data Processing subsystems to achieve a highly automated production system
- Interfaces with the Algorithm Integration and Test Tools CSCI within DPS for information on Product Generation Executives (PGEs)
- Permits entry of Production Requests and generates resulting Data Processing Requests (DPRs)
- Uses a set of Raytheon-provided COTS libraries as a basis for its scheduling components (Resource Planning Workbench and Production Planning Workbench)

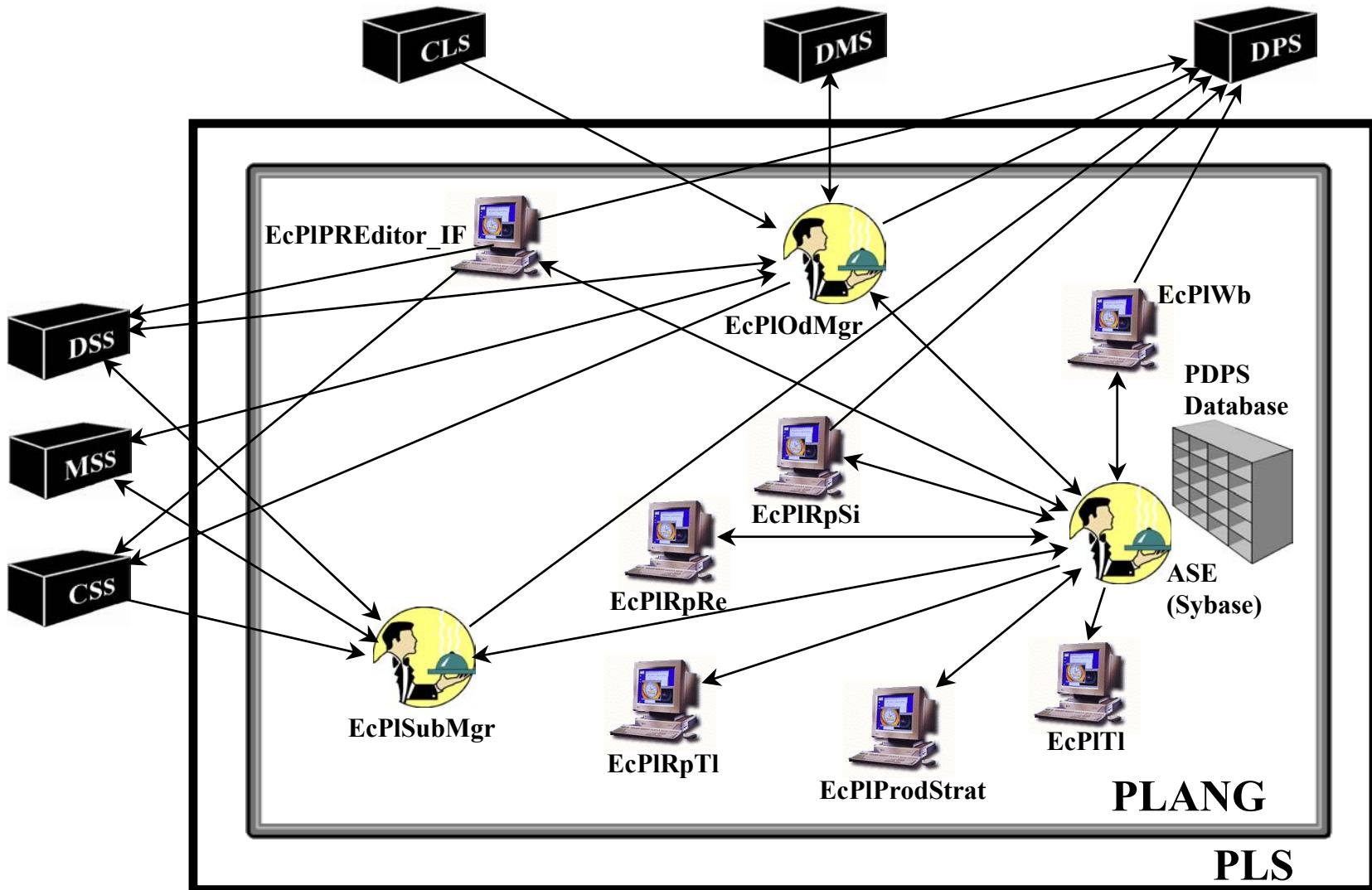


# Subsystems and CSCIs: PLS (Cont.)

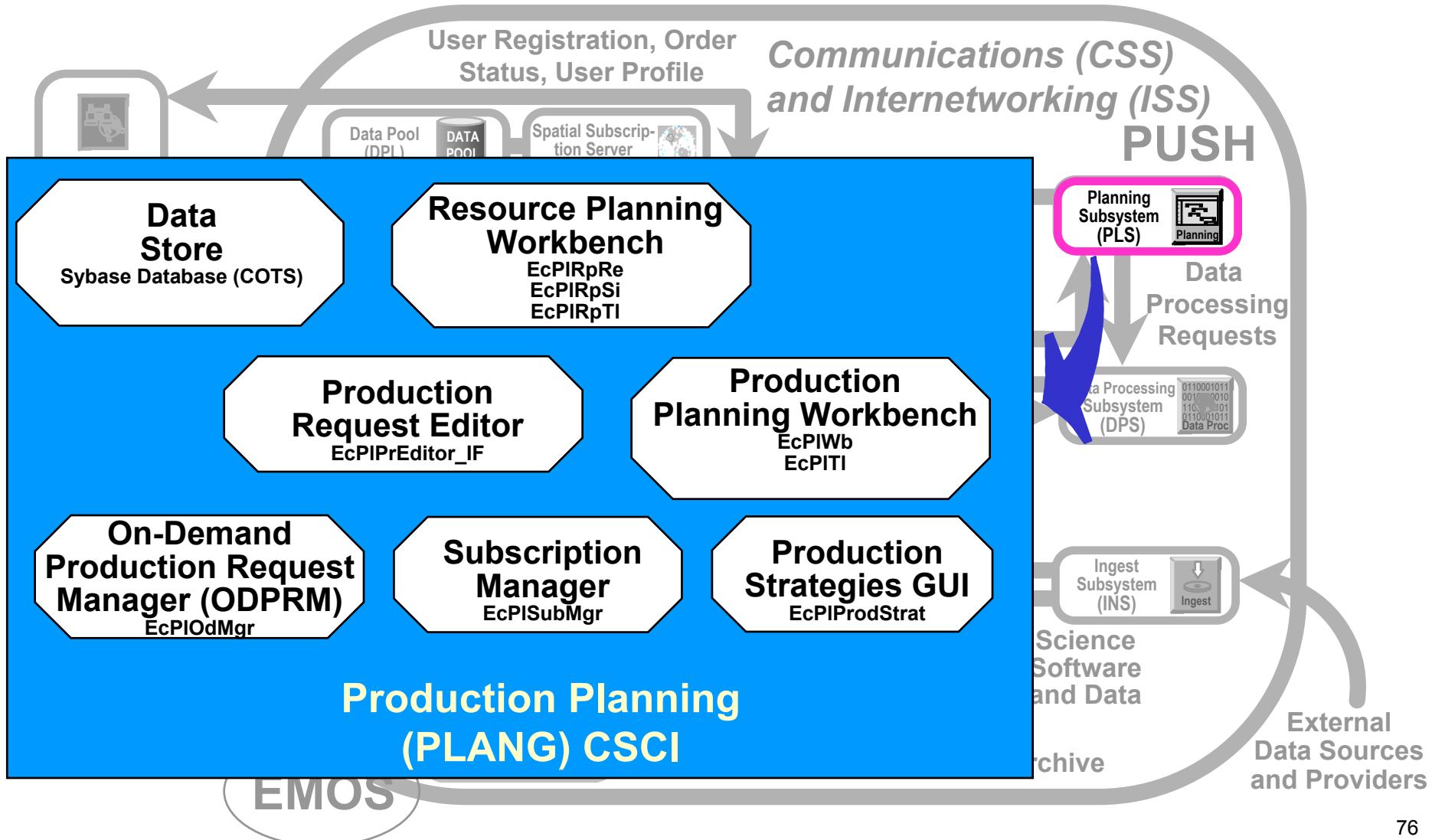
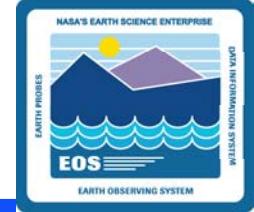
- Production Planning (PLANG) CSCI
  - Seven major components
    - Data Store - handles insertion of data for planning and processing activities into the PDPS shared database
    - Resource Planning Workbench - GUIs for preparing a site resource schedule [Resource Editor (EcPIRpRe), Scheduling Interface (EcPIRpSi), Timeline (EcPIRpTI)]
    - Production Request Editor - GUI for submitting production requests that describe the data products to be produced; uses PGE descriptions to generate the DPRs necessary to meet the requests (EcPIPREditor\_IF)
    - Production Planning Workbench - GUIs for preparing a site production schedule [Workbench (EcPIWb) and Timeline (EcPITI)]
    - On-Demand Production Request Manager - receives requests for data from the scientist via the EDG web page, generates the necessary Production Request, submits it for processing, and distributes the data to the scientist (EcPIOdMgr)
    - Subscription Manager - server to manage receipt of subscription notifications from the Data Server via SBSRV (EcPISubMgr)
    - Production Strategies GUI - used to create a set of planning priorities to be applied to each DPR in a plan (EcPIPProdStrat)

# Subsystems and CSCIs: PLS (Cont.)

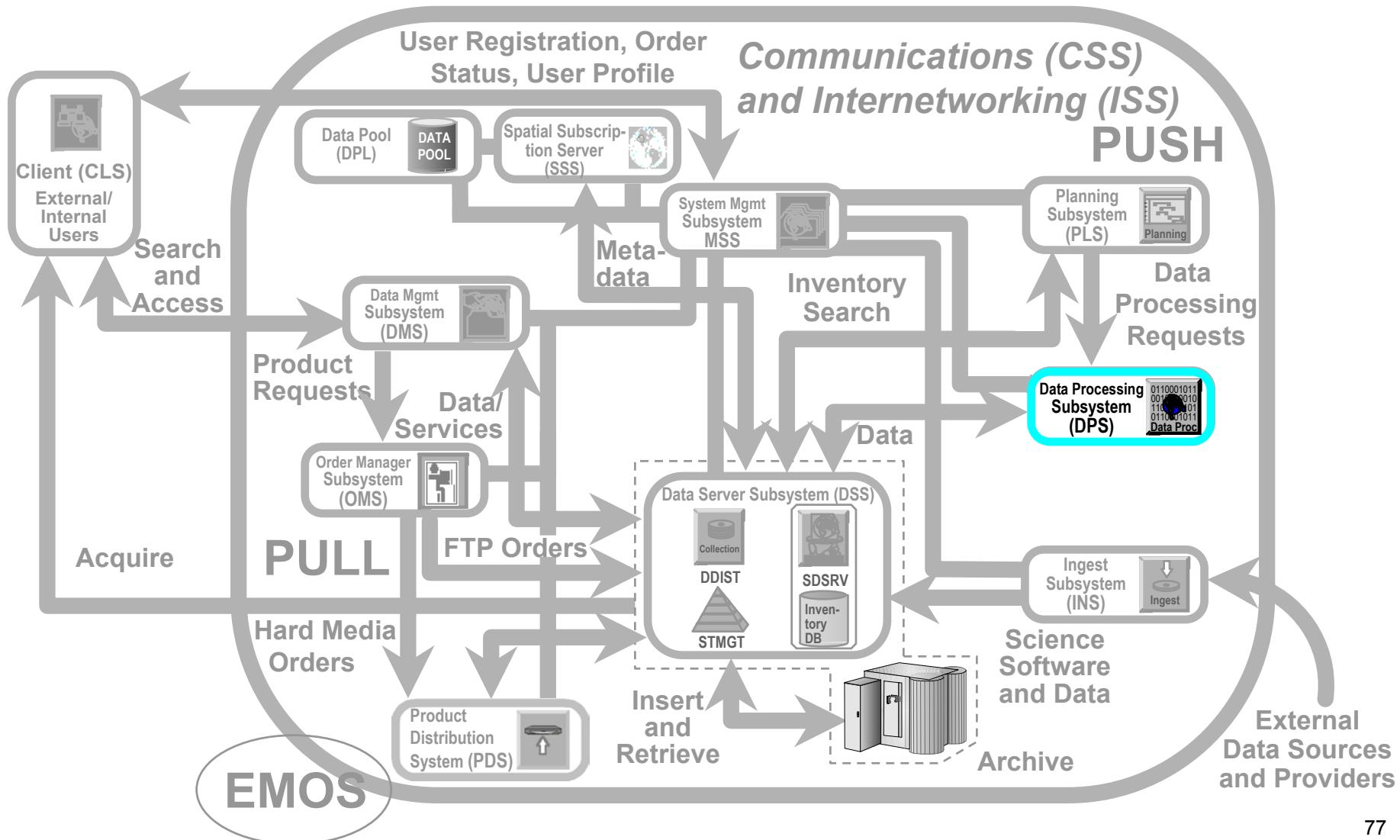
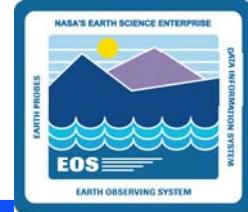
## PLAN<sup>G</sup> Architecture and Interfaces



# Subsystems and CSCIs: PLS (Cont.)



# Subsystems and CSCIs: DPS

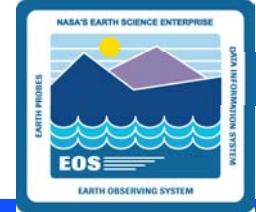




# Subsystems and CSCIs: DPS

- **Data Processing Subsystem (DPS)**
  - Manages allocation and recovery of computer resources (e.g., CPU, disk space) used in processing science data
  - Manages, queues, and executes DPRs
  - Supports execution of science algorithms through the Science Data Processing (SDP) Toolkit
  - Supports preliminary processing of ancillary data sets
  - Provides an Algorithm Integration and Test (AIT) environment for the introduction of science software
  - Provides a Quality Assessment (QA) environment for updating the quality flags in metadata for data products
  - Uses COTS tools
    - AutoSys: a job scheduling software application to automate operations in a distributed UNIX environment
    - AutoXpert: provides mechanisms and GUIs to monitor and manage the job schedule being processed in AutoSys
    - Sybase: ASE server

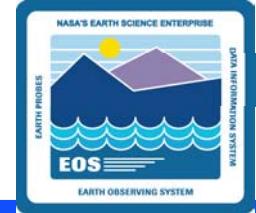




# Subsystems and CSCIs: DPS (Cont.)

- **Processing (PRONG) CSCI**
  - Provides services required to manage and monitor the Science Data Processing environment, which executes Science Software items (PGEs) and produces data products
  - Nine major components
    - **Job Management** - handles flow of information to the COTS products; also creates and starts Ground Event jobs
    - **Execution Management** - initiates execution of PGEs and performs final activities subsequent to execution of PGEs; handles flow of science data to and from science processing resources (through a data management software library, DpPrDM); also provides status of On-demand Processing requests
    - **PGE Management** - controls and monitors execution of PGEs and the growth of the output products (EcDpPrRunPGE); measures and reports resource use to AutoSys (EcDpPrRusage)

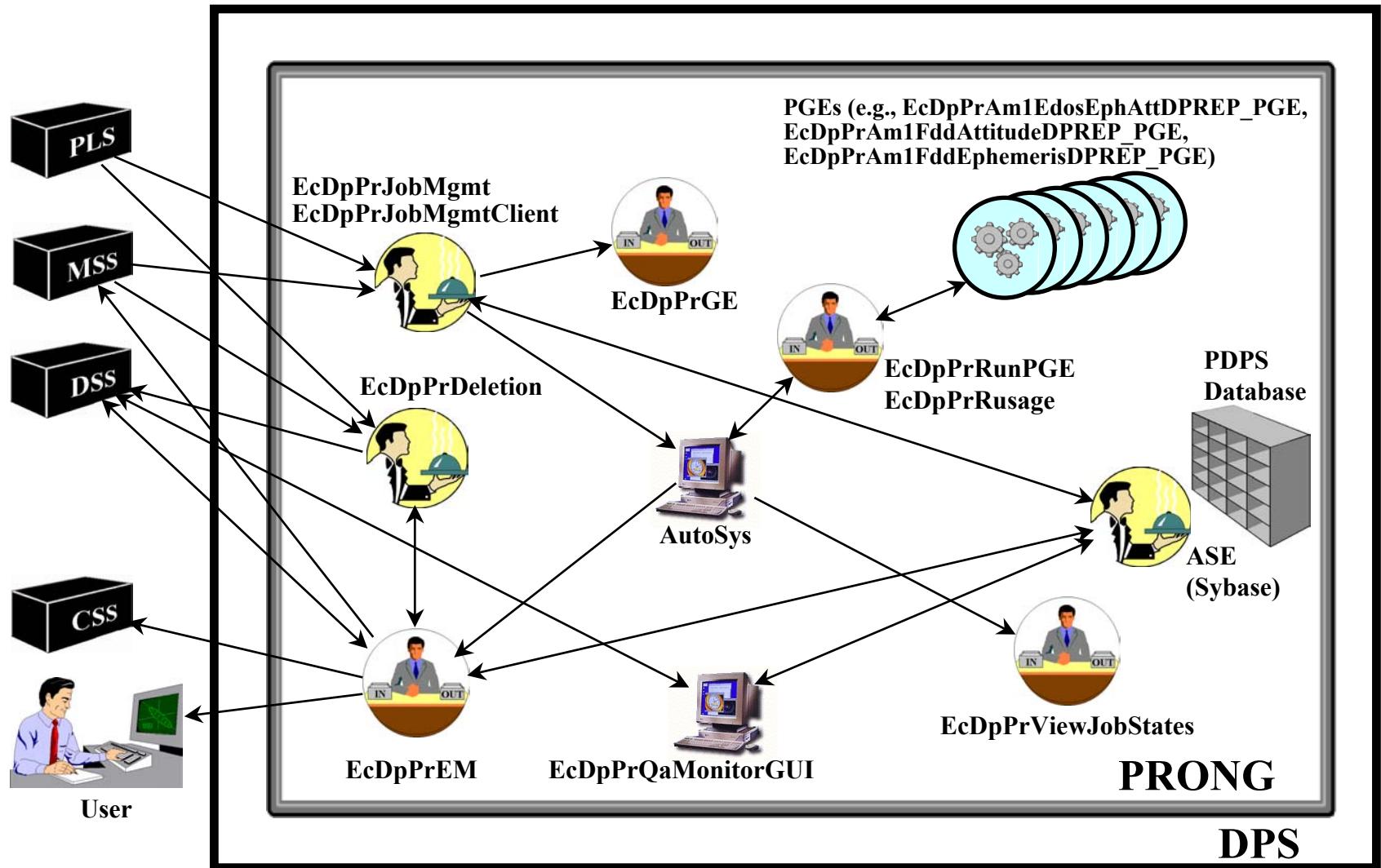
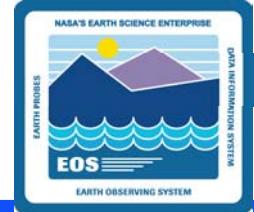
# Subsystems and CSCIs: DPS (Cont.)



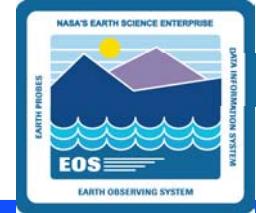
- Processing (PRONG) CSCI (Cont.)
  - Nine major components (Cont.)
    - **Deletion Server** - notifies Science Data Server to remove interim granules that are no longer needed
    - **Quality Assurance Monitor** - supports visualizing science data products and updating QA metadata
    - **Data Preprocessing** - manages preprocessing of ancillary data used as inputs to a PGE
    - **AutoSys** - provides the job scheduling engine (COTS)
    - **Data Store** - handles insertion of data for planning and processing activities into the PDPS shared database
    - **Ground Event Process** - initiated by Job Management upon receipt of a ground event request; sets a computer resource to an off-line state, making it unavailable for PGEs during the request

# Subsystems and CSCIs: DPS (Cont.)

## PRONG Architecture and Interfaces



# Subsystems and CSCIs: DPS (Cont.)



- **Algorithm Integration and Test Tools (AITTL) CSCI**
  - Provides a set of tools used for testing and integration of new science software, new versions of science software, and user methods into the Science Data Processing operational environment
  - Combines custom-developed code with COTS software
  - Tools are accessed from a centralized application called the Science Software Integration and Test (SSIT) Manager

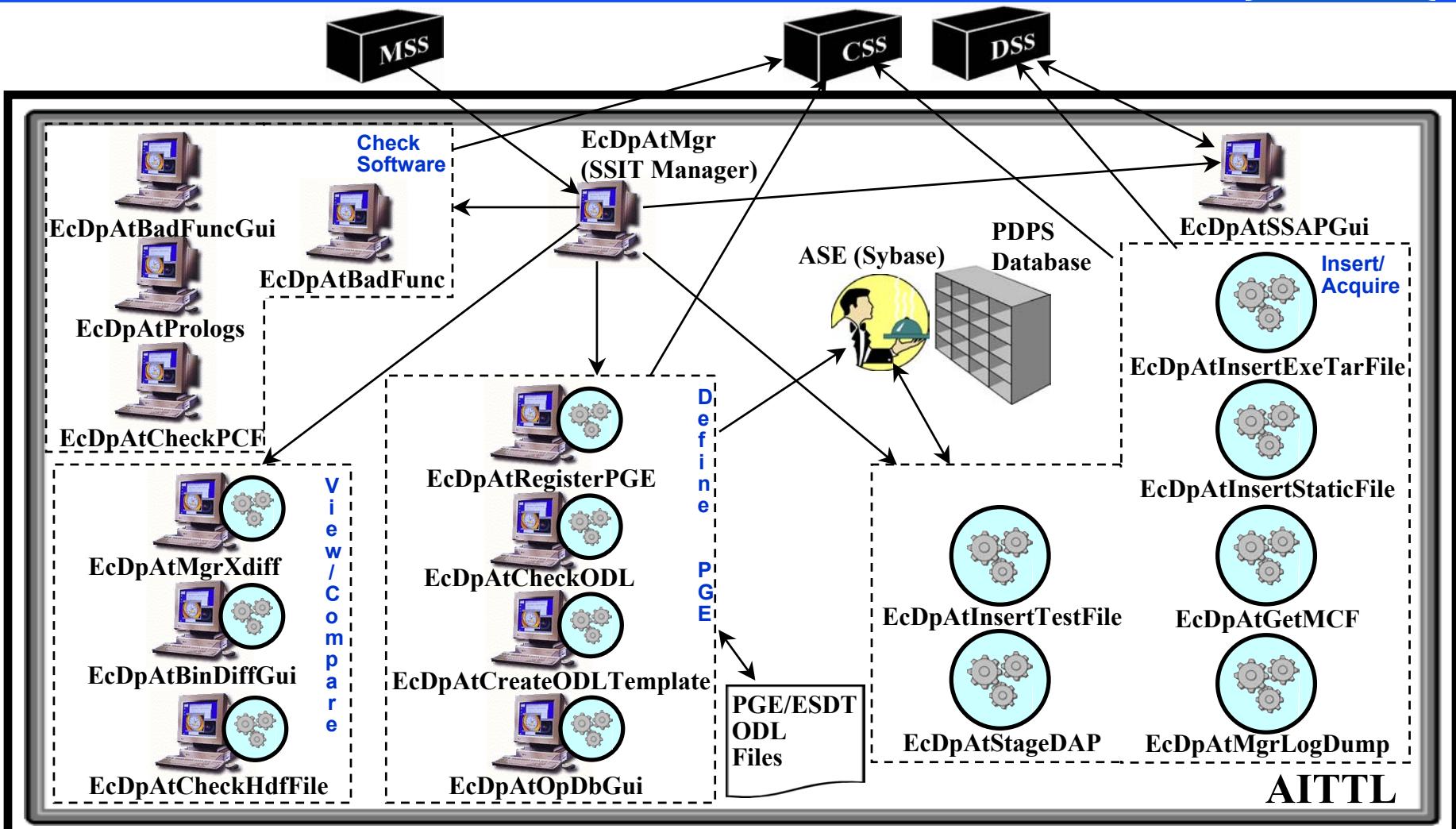
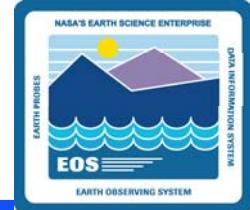
# Subsystems and CSCIs: DPS (Cont.)



- Algorithm Integration and Test Tools (AITTL) CSCI (Cont.)
  - Six major components
    - **Science Software Archive Package (SSAP) GUI** - allows for the creation, update, and deletion of SSAPs
    - **SSIT Manager** - GUI for SSIT activities; provides menus to launch other SSIT applications and a checklist to mark completion of SSIT functions
    - **Define PGE** - a group of applications to specify a PGE in the PDPS database
    - **View/Compare Tools** - a group of applications for viewing and comparing data files
    - **Check Software Tools** - a group of applications that check the source code for PGEs and their process control files (PCFs) for errors or prohibited functions
    - **Insert/Acquire Tools** - a group of applications that provide mechanisms to insert and acquire data items from Data Server

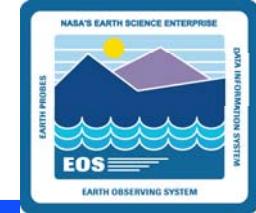
# Subsystems and CSCIs: DPS (Cont.)

## AITTL Architecture and Interfaces



DPS

# Subsystems and CSCIs: DPS (Cont.)



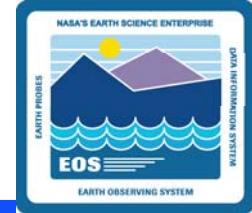
- **SDP Toolkit (SDPTK) CSCI**
  - Not described in detail in this course
  - Provides a set of software tools used to integrate Science Software into ECS
  - Provides common functionality (e.g., geolocation) required across the ECS community
  - Allows Science Data Processing to support generation of data products in a heterogeneous computer hardware environment
    - Facilitates the smooth transition and integration of science software code into the DAAC by abstracting out science process dependencies on external system architecture
    - Provides an interface between science software and the production system environment
    - Interface is implemented in both the SCF development environments and DAAC production environments



# Subsystems and CSCIs: DPS (Cont.)

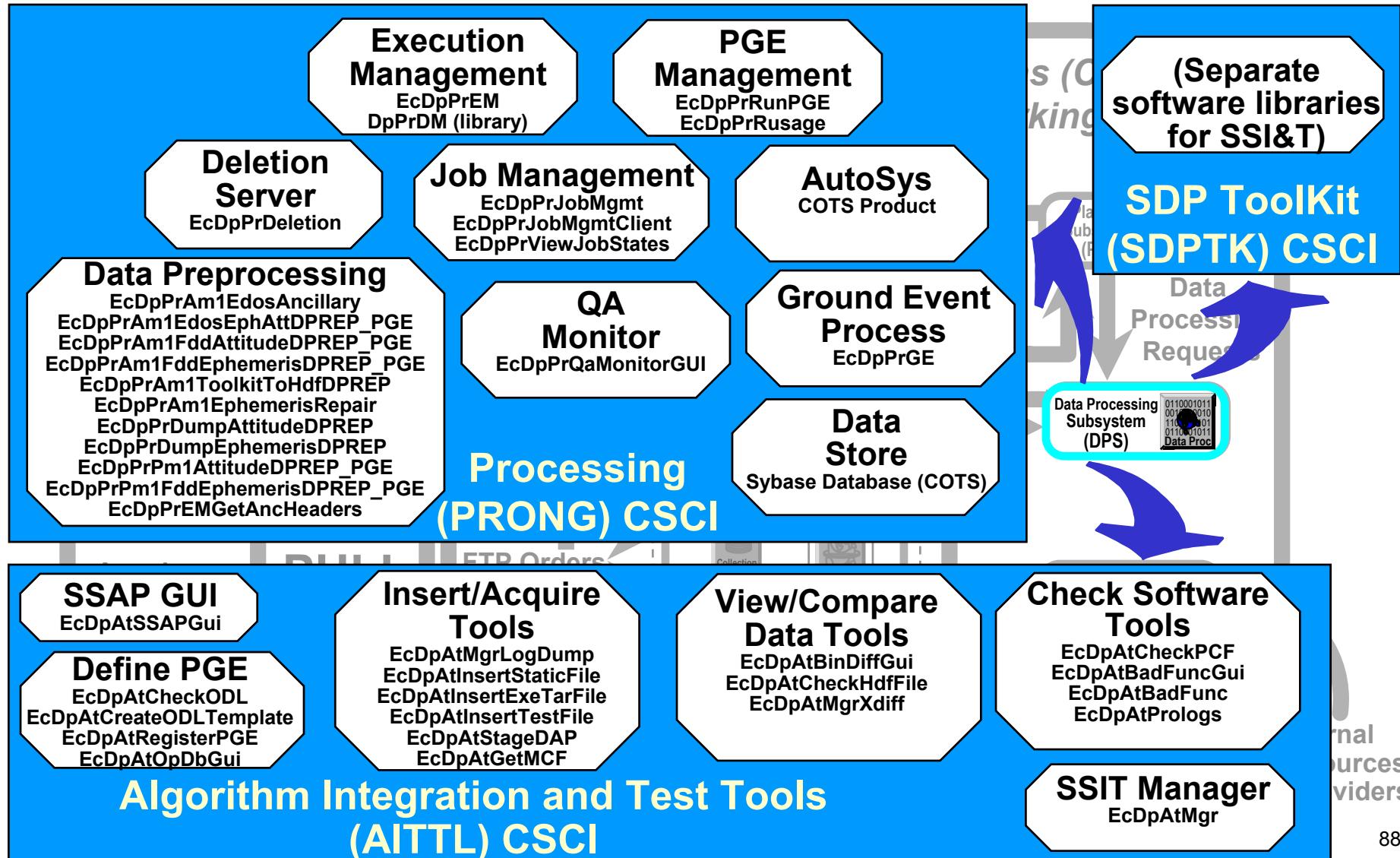
- **SDP Toolkit (SDPTK) CSCI (Cont.)**
  - **Insulates science software from the SDP software and provides a development environment that emulates critical SDP functions**
    - Helps ensure code portability as the algorithm is ported from development hardware, through the DAAC system, and through potential hardware changes as ECS matures
    - Provides for limited access and control to system level resources, including processes, shared memory, and I/O capabilities
    - Where control of system resources is necessary (e.g., shared memory allocation), Toolkit provides a set of routines through which the application must obtain those services
    - Partitioning and layering of operating system services allows Toolkit to work on behalf of DPS in allocating, deallocating, and making use of system-wide shared resources

# Subsystems and CSCIs: DPS (Cont.)

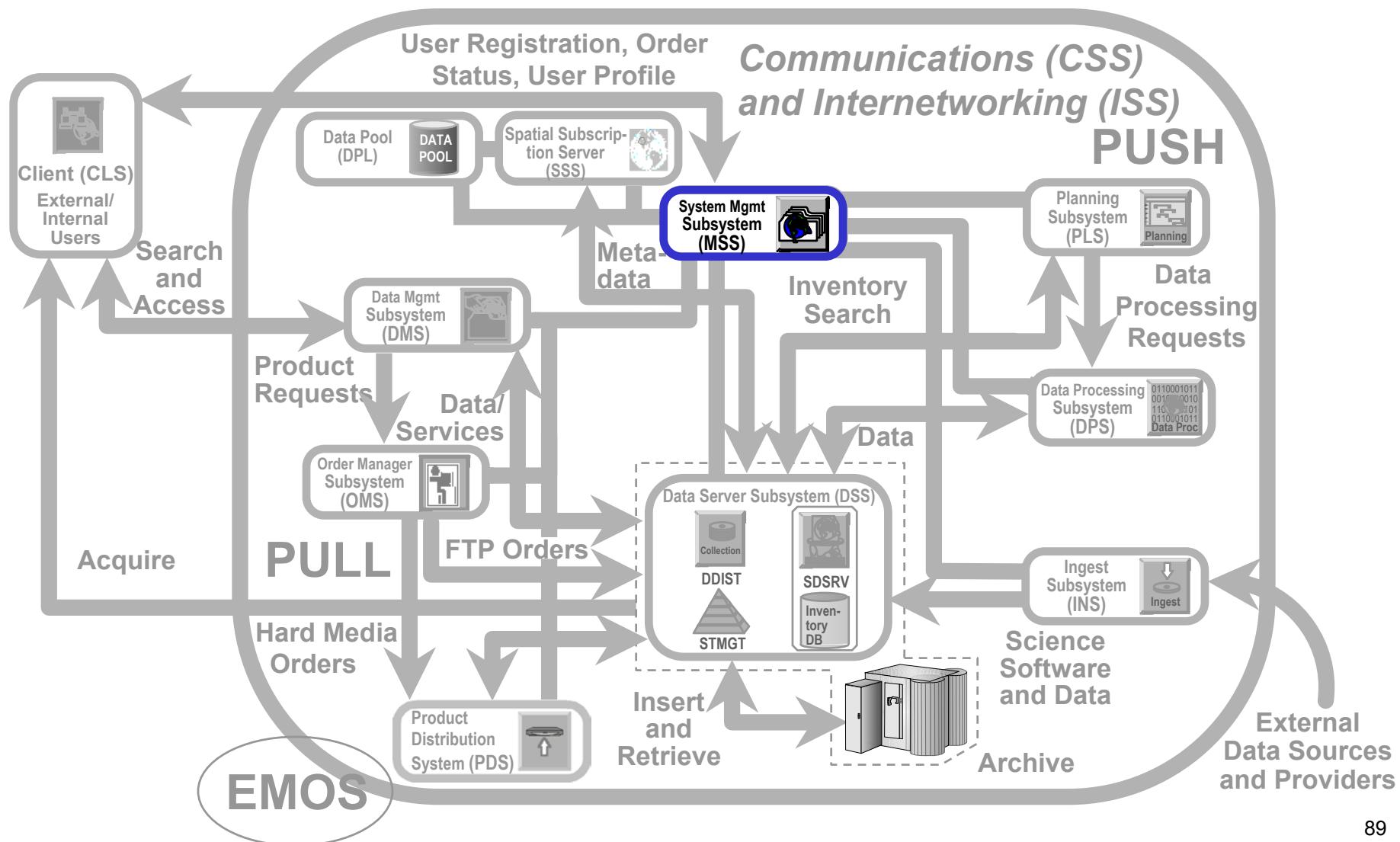
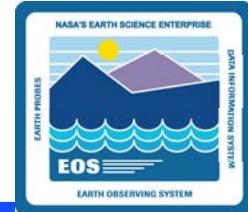


- **SDP Toolkit (SDPTK) CSCI (Cont.)**
  - SDP Toolkit Tools - Mandatory
    - File I/O Tools
    - Error/Status Reporting [Status Message File (SMF) Tools]
    - Process Control Tools
    - Shared Memory Management Tools
    - Bit Manipulation Tools
    - Spacecraft Ephemeris and Attitude Data Access Tools
    - Time and Date Conversion Tools
  - SDP Toolkit Tools - Optional
    - Digital Elevation Model Tools
    - Ancillary Data Tools
    - Celestial Body Position Tools
    - Coordinate System Conversion Tools
    - Geo-Coordinate Transformation Tools
    - Math and Statistical Support Tools
    - Constants and Unit Conversions
    - Dynamic Memory Management Tools
    - Graphics Support Tools

# Subsystems and CSCIs: DPS (Cont.)



# Subsystems and CSCIs: MSS





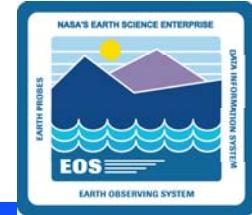
# Subsystems and CSCIs: MSS

- **System Management Subsystem (MSS)**
  - Provides the set of tools needed by maintenance and operations staff to manage ECS operations
  - Addresses 5 areas
    - Fault Management
    - Configuration Management
    - Accountability Management
    - Performance Management
    - Security Management
  - Installed locally at each DAAC and at System Monitoring and Coordination Center (SMC)
  - Uses COTS applications extensively, including Sybase Replication Server
  - Includes **ECS Assistant**, a GUI that runs an extensive array of UNIX scripts for system installation, monitoring, and administration

System Mgmt  
Subsystem  
(MSS)

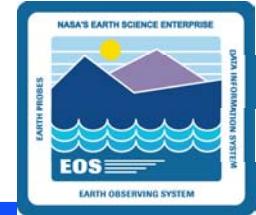


# Subsystems and CSCIs: MSS (Cont.)



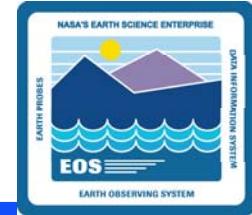
- **Management CSCI (MCI)**
  - Primarily COTS-based, with some custom software
  - Provides services for monitoring and coordinating ECS
  - **Network and Enterprise Management Framework component**
    - **Whazzup???**
      - Monitors server status
      - Monitors host resource usage
    - **WhatsUp Gold**
      - Network monitoring
      - Fault detection
  - **Security component**
    - Various freeware or public domain packages
    - Monitor and evaluate security and report status

# Subsystems and CSCIs: MSS (Cont.)



- **Management CSCI (MCI) (Cont.)**
  - **Accountability Management Service (AMS) component**
    - Custom software
    - Account Management Tool (for User Registration and User Profile updates)
    - Order Tracking Tool
    - Sybase ASE Server/Sybase Replication Server

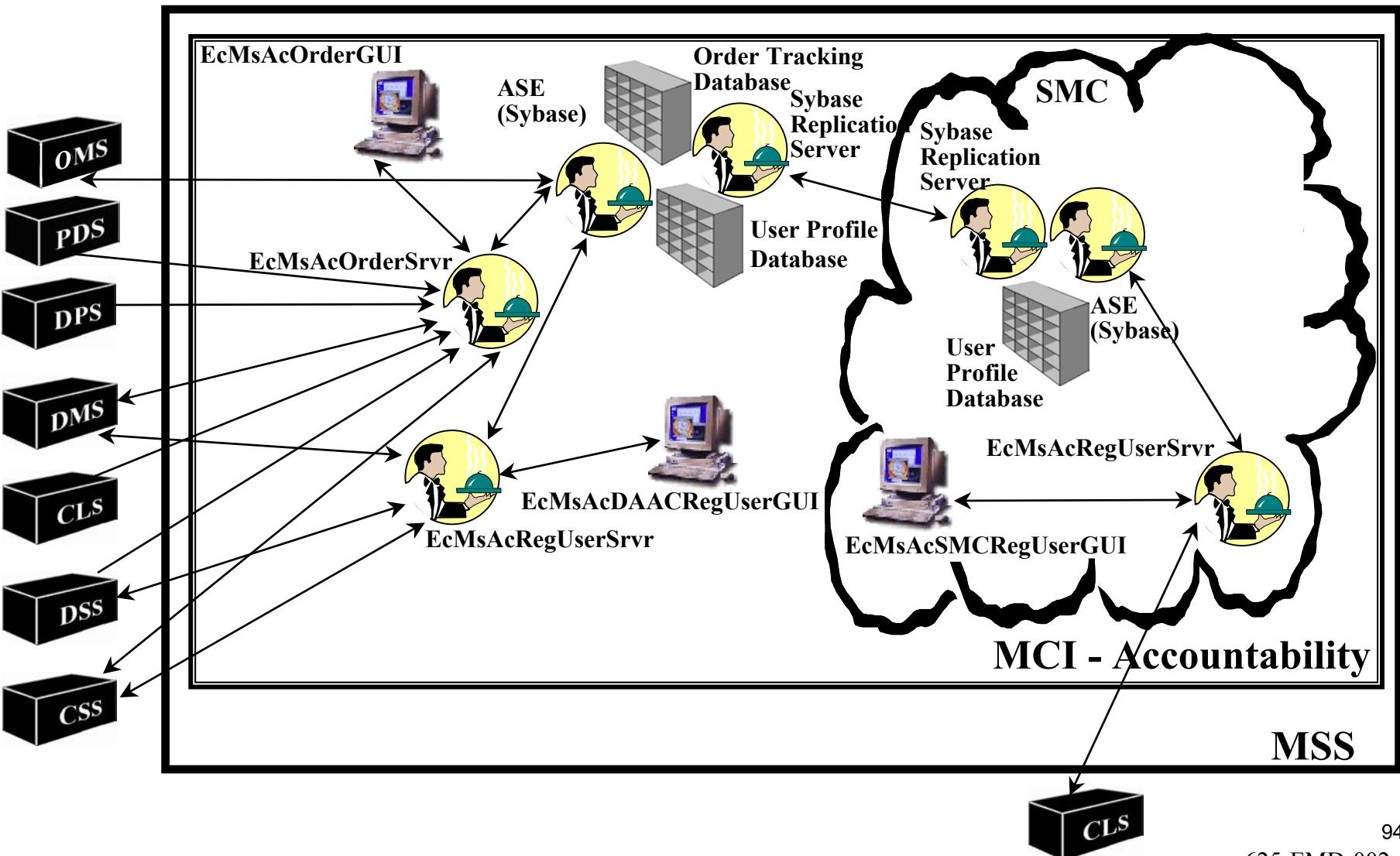
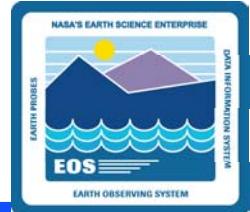
# Subsystems and CSCIs: MSS (Cont.)



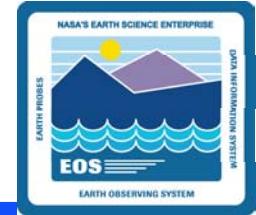
- **Management CSCI (MCI) (Cont.)**
  - **Trouble Ticketing component**
    - Custom-configured COTS software: Remedy Action Request System
  - **Network Backup/Restore component**
    - COTS software: Legato Networker
  - **ASTER Standard Header Handler component**
    - Custom scripts work with COTS e-mail to add a formatted header to all e-mail exchanges between the ASTER Ground Data System and ECS

# Subsystems and CSCIs: MSS (Cont.)

## AMS Architecture and Interfaces

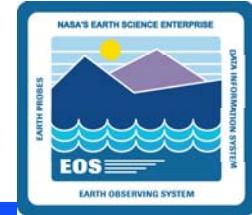


# Subsystems and CSCIs: MSS (Cont.)



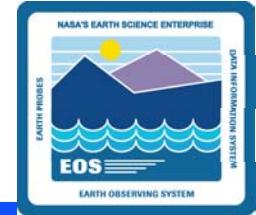
- **Management Logistics CSCI (MLCI)**
  - Implements Configuration Management services
  - **Baseline Manager component**
    - Customized COTS software: a ClearCase application
    - Uses Sybase Relational Database Management System
    - Helps maintain records that document the hardware and software items that comprise baselined, operational system configurations

# Subsystems and CSCIs: MSS (Cont.)



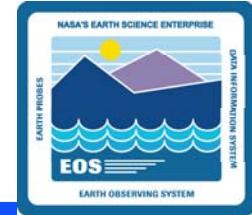
- **Management Logistics CSCI (MLCI) (Cont.)**
  - **Inventory/Logistics/Maintenance (ILM) Manager component**
    - Customized COTS software: a Remedy application
    - Tracks and maintains key data on ECS contract-purchased equipment, hardware, COTS software, COTS documentation (hardware and software), spares and consumable items, and Government Furnished Equipment (GFE)
    - Stores and maintains detailed maintenance data on hardware to the component level, including preventive and corrective maintenance

# Subsystems and CSCIs: MSS (Cont.)



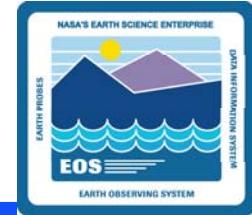
- **Management Logistics CSCI (MLCI) (Cont.)**
  - **Software Change Manager component**
    - Consists of COTS and custom software
      - ClearCase (with some customization)
      - Supporting UNIX scripts
    - Helps organize and partition software, control software changes and versions, and assemble sets of software for release

# Subsystems and CSCIs: MSS (Cont.)

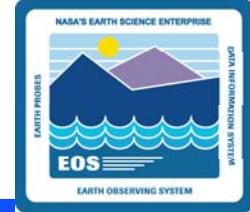


- **Management Logistics CSCI (MLCI) (Cont.)**
  - **Change Request Manager** component
    - Customized COTS application: Distributed Defect Tracking System (DDTS)
    - Enables DAACs and SMC to enter, maintain, and track Configuration Change Requests (CCRs)
    - Provides capability to compose and maintain local CCRs and to compose and submit CCRs to the SMC for system-wide consideration
    - Communication between site Change Request Managers can be established through a DDTS utility program and maintained by each site's DDTS administrator

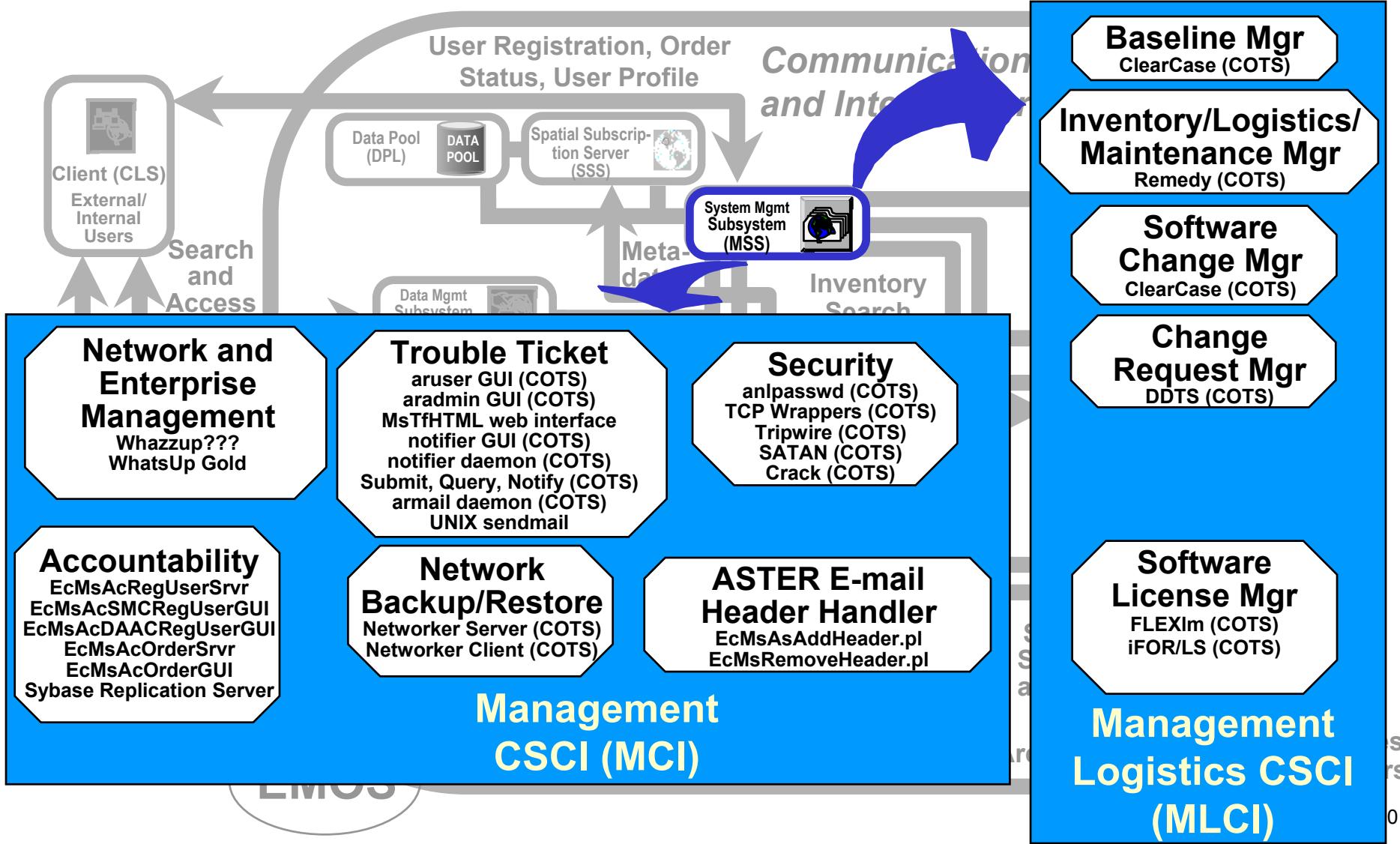
# Subsystems and CSCIs: MSS (Cont.)



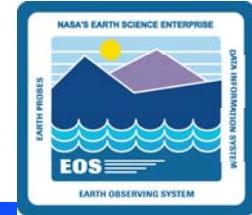
- **Management Logistics CSCI (MLCI) (Cont.)**
  - **Software License Manager component**
    - COTS software
      - FLEXlM (license manager) and iFOR/LS (license server daemon) COTS packages
    - Manages network licensing activities associated with using COTS products; maintains information about license provisions, meters use of installed licenses, and reports on licensing events and statistics



# Subsystems and CSCIs: MSS (Cont.)



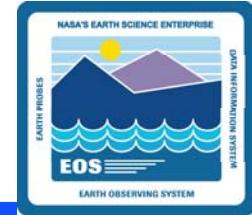
# Subsystems and CSCIs: CSS (Cont.)



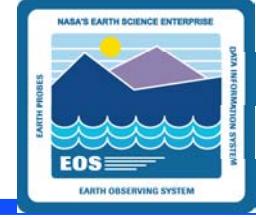
## *CSS/Distributed Communications Software*

- **Communications Subsystem (CSS)**
  - Provides for interconnection of users and service providers and transfer of information within ECS and between ECS and other EOSDIS components, including a machine-to-machine gateway for SIPS access to ECS data
  - Supports and interacts with the System Management Subsystem (MSS), ECS Mission Operations Segment (EMOS), and all other subsystems
  - Uses several COTS tools: RogueWave class libraries, Builder Xcessory (GUI Builder tool), Sybase ASE Server (for Subscription Server insert, search, and update), UNIX Network Services

# Subsystems and CSCIs: CSS (Cont.)



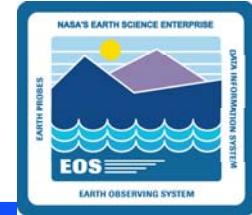
- **Distributed Computing Configuration Item (DCCI)**
  - **Subscription Server (SBSRV) and GUI components**
    - Detects previously defined events
    - Performs specified actions for clients that have previously subscribed to those events (e.g., science granule insertion, metadata update, science granule deletion)
    - Being replaced by Spatial Subscription Server (NSBRV)
  - **ASTER DAR Gateway Server component (hosted at EDC)**
    - Provides interoperability between ASTER DAR Client GUI tool and the DAR API which interfaces to the ASTER servers
  - **ASTER EMailParser Gateway component**
    - Support for automated delivery of ASTER Expedited Data Sets (EDS) from ECS to ASTER Ground Data System (GDS)
  - **Message-Oriented Java Object (MOJO) Gateway Server component**
    - Gateway for access by the ASTER DAR Tool to all ECS Services; directs DARs to GDS via ASTER DAR Gateway



# Subsystems and CSCIs: CSS (Cont.)

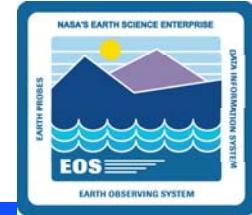
- **Distributed Computing Configuration Item (DCCI) (Cont.)**
  - **CCS Middleware Support** component
    - COTS server locator services software
  - **FTP (File Transfer Protocol)** component (standard application for file transfers)
  - **FTP Notification** component (for notification of successful FTP pulls from a pull area)
  - **BDS (Bulk Data Server)** component (fast file transfer over high-speed networks such as Gigabit Ethernet)
  - **NFS (Network File System)** component (for file systems sharing among computers)
  - **Filecopy** component (a simple utility to copy large files from a specified source to a specified destination, with compression options)

# Subsystems and CSCIs: CSS (Cont.)



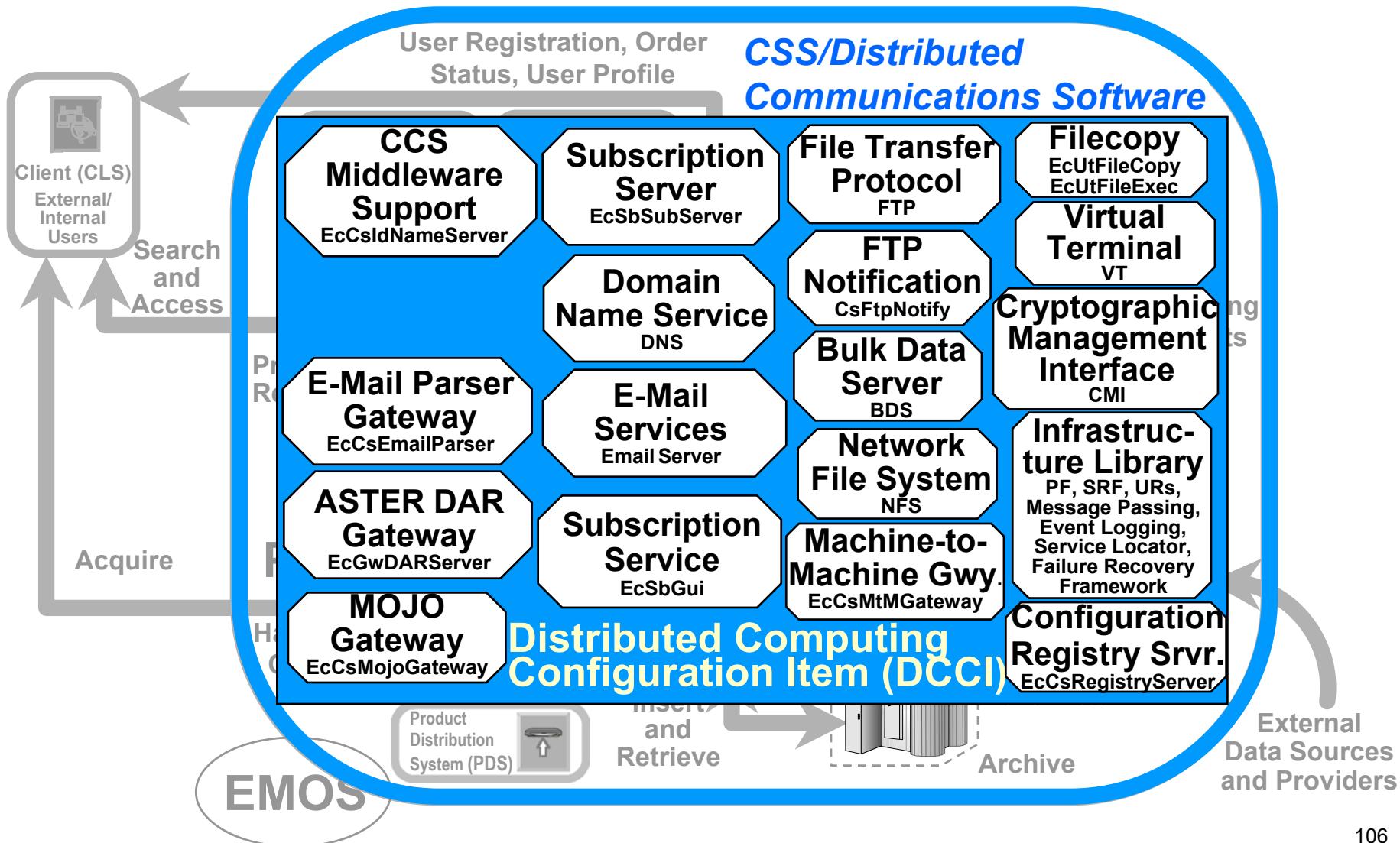
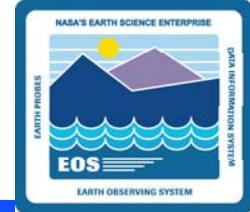
- **Distributed Computing Configuration Item (DCCI) (Cont.)**
  - **Mail Support Group component**
    - Provides electronic mail, with an interactive interface and an object-oriented application program interface
  - **Virtual Terminal component**
    - Provides operators the capability for remote logon from one ECS machine to another
  - **Cryptographic Management Interface (CMI) component**
    - Allows processes to obtain random passwords and gain access to Sybase
  - **Machine-to-Machine Gateway component**
    - Provides an automated search and order capability to allow the Science Investigator-Led Processing Systems (SIPS) to reprocess data externally from the ECS

# Subsystems and CSCIs: CSS (Cont.)

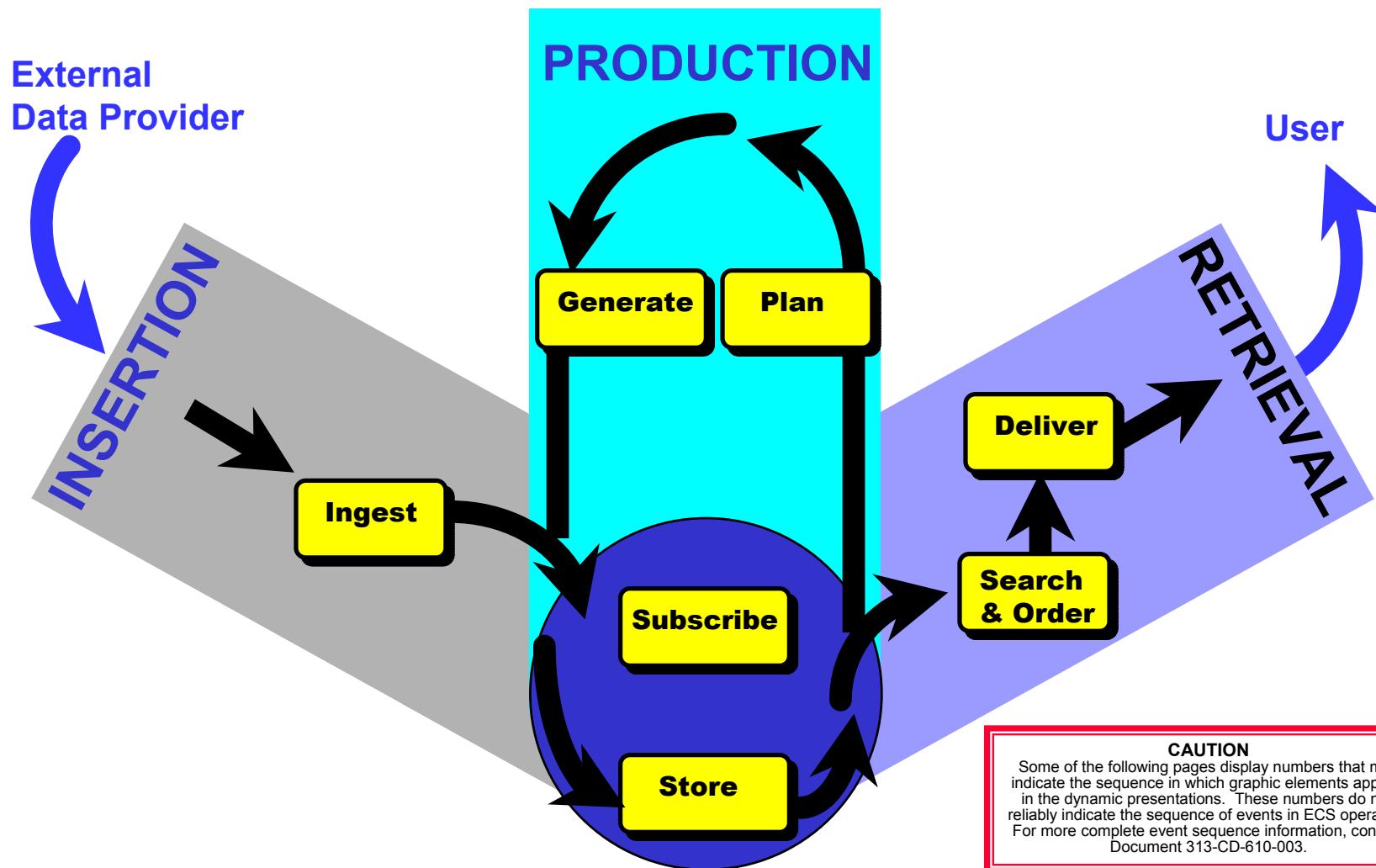
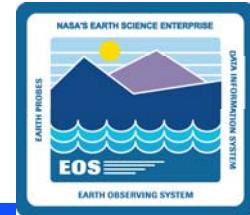


- **Distributed Computing Configuration Item (DCCI) (Cont.)**
  - **Domain Name Service (DNS) component**
    - Provides information about host names and addresses on a network by querying and answering queries
    - Performs naming between hosts within the local administrative domain and across domain boundaries
    - **Note:** The external DNS is located on the Firewall in ISS
  - **Infrastructure Library component**
    - Provides a set of services to facilitate the implementation of client-server applications; includes Process Framework (PF), Service Request Framework (SRF), Message Passing, Universal References (URs), Event Logging, Service Locator, Time Service, and Failure Recovery Framework
  - **Configuration Registry Server component**
    - Provides a single interface to retrieve configuration attribute-value pairs for ECS servers from the Configuration Registry Database, via Sybase Server

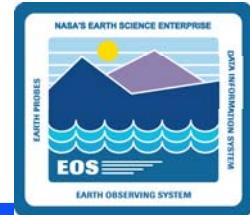
# Subsystems and CSCIs: CSS (Cont.)



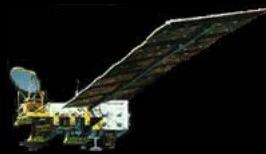
# ECS Operational Functioning



# ECS Release 7 Focus



**Terra**



**Aqua**



**Aura**



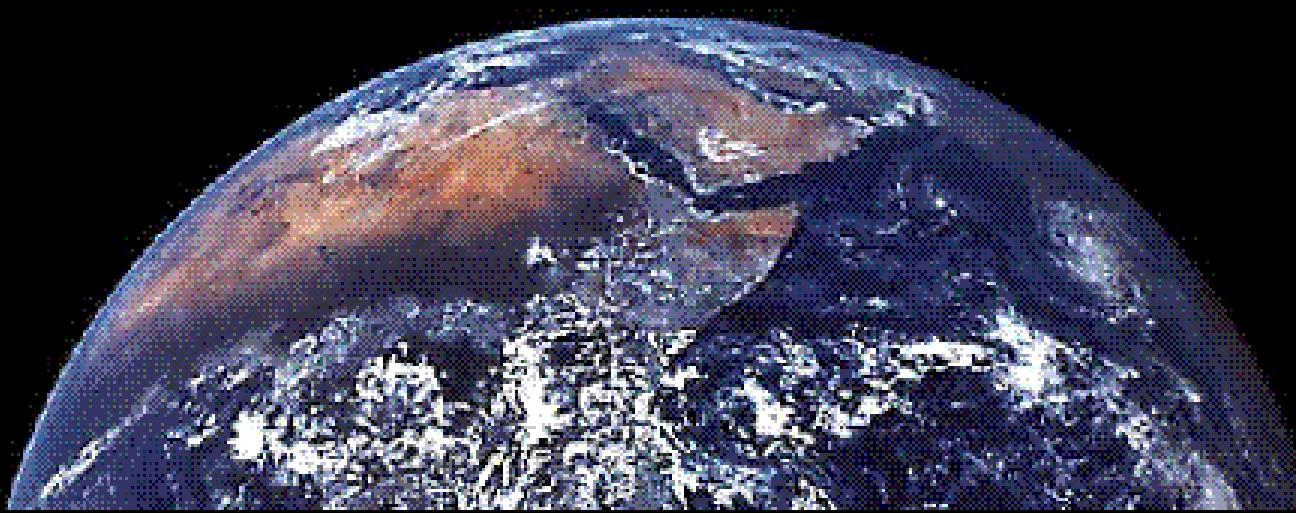
**METEOR - SAGE III**

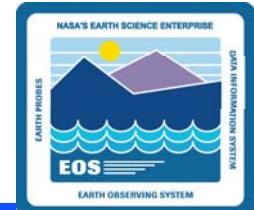


**DATA  
ASSIMILATION  
OFFICE**

Goddard Space Flight Center Greenbelt, MD

**DAO**





# ASTER Scenario



## ASTER

- 1 DAR Support**
- 2 Chaining**
- 3 Expedited Data**

### ASTER Goals

- ASTER DAR Tool Usage
- On-Demand Processing and Chaining
- SCF QA Metadata Update Workaround
- Simplified ASTER Expedited Data Support
- Data Tape Ingest

### ASTER Preconditions

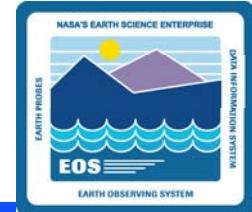
ASTER ESDTs Inserted into ECS

-AST\_ANC, AST\_EXP, AST\_L1A, AST\_L1BT,  
AST\_09T, AST\_04, AST\_05, AST\_08, GDAS0ZFH

ASTER PGEs passed SSI&T and installed  
- ACT, ETS, BTS

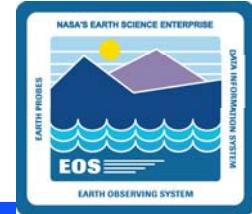
Ancillary data inserted into Data Server

# ASTER Scenario: DAR Support

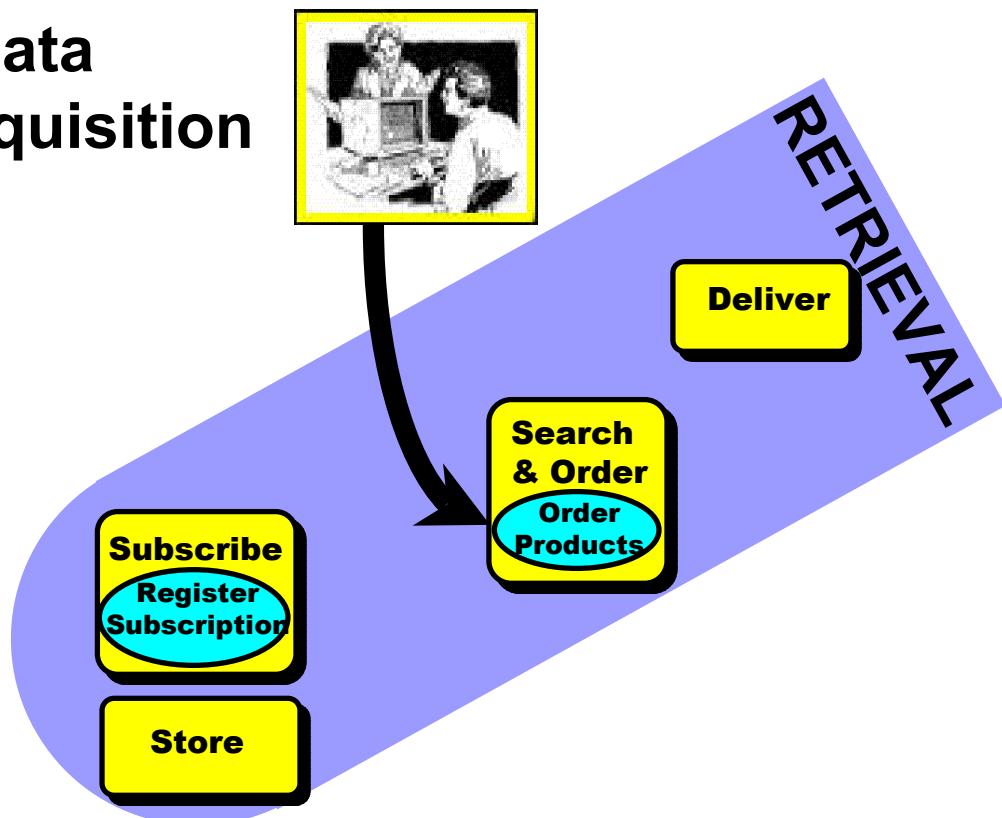


# DAR Submission Data Subscription On-Demand Request

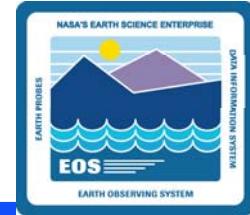
# DAR Support



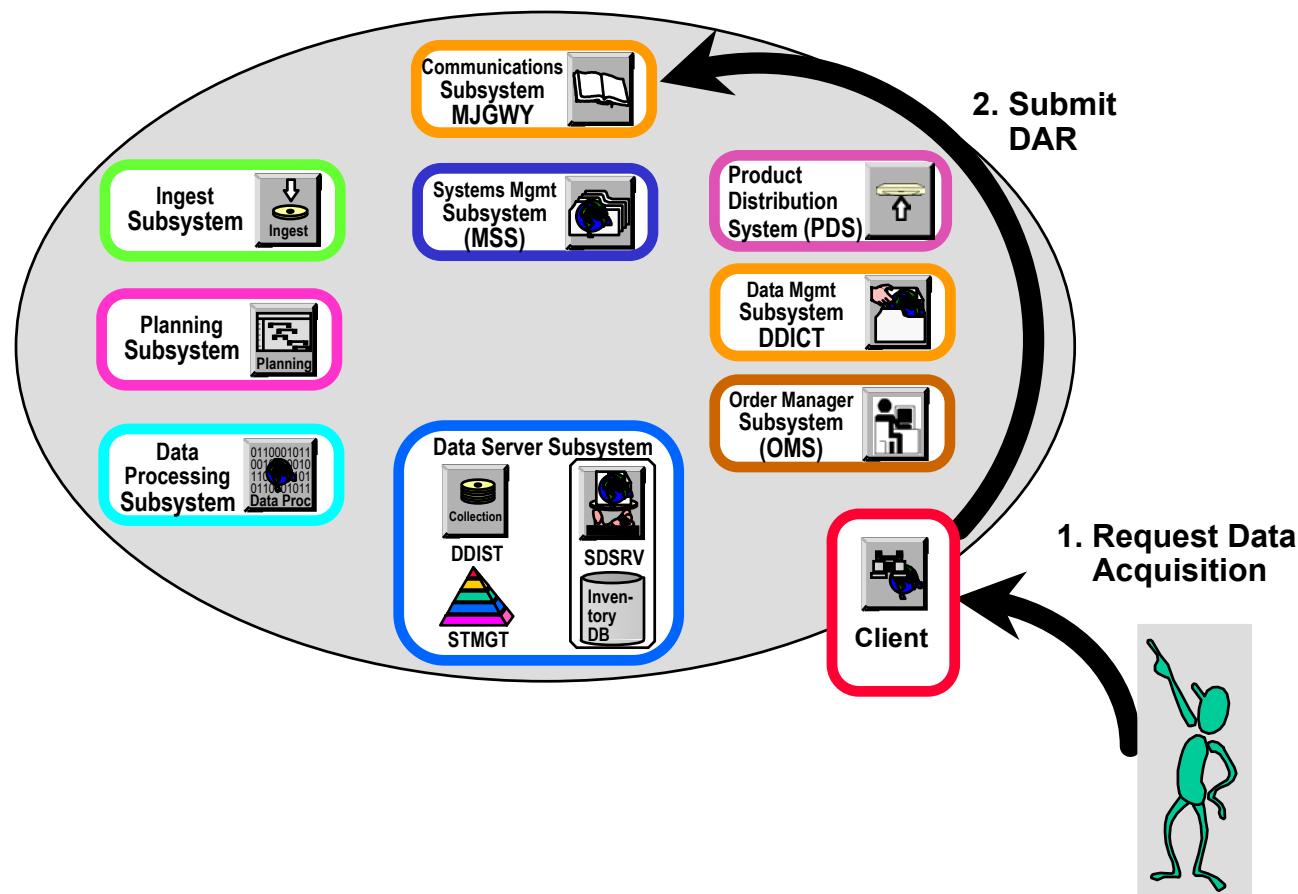
**ASTER Scientist decides  
to request ASTER data  
requiring a Data Acquisition  
Request**



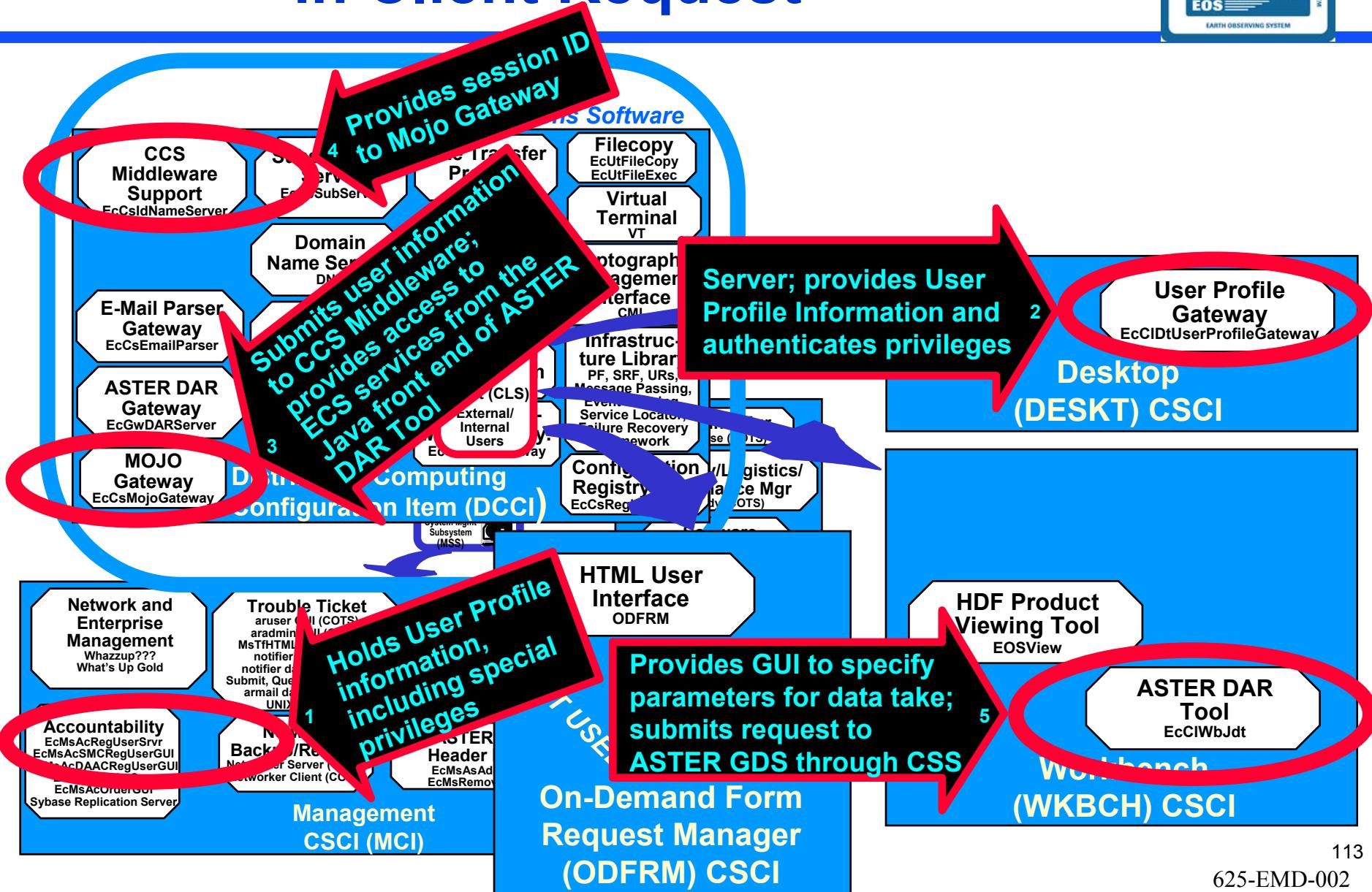
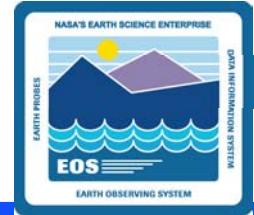
# ASTER: Client Request Process



ASTER Scientist determines an area of interest. The scientist decides to request an ASTER data take over that area, using the ASTER DAR Tool.



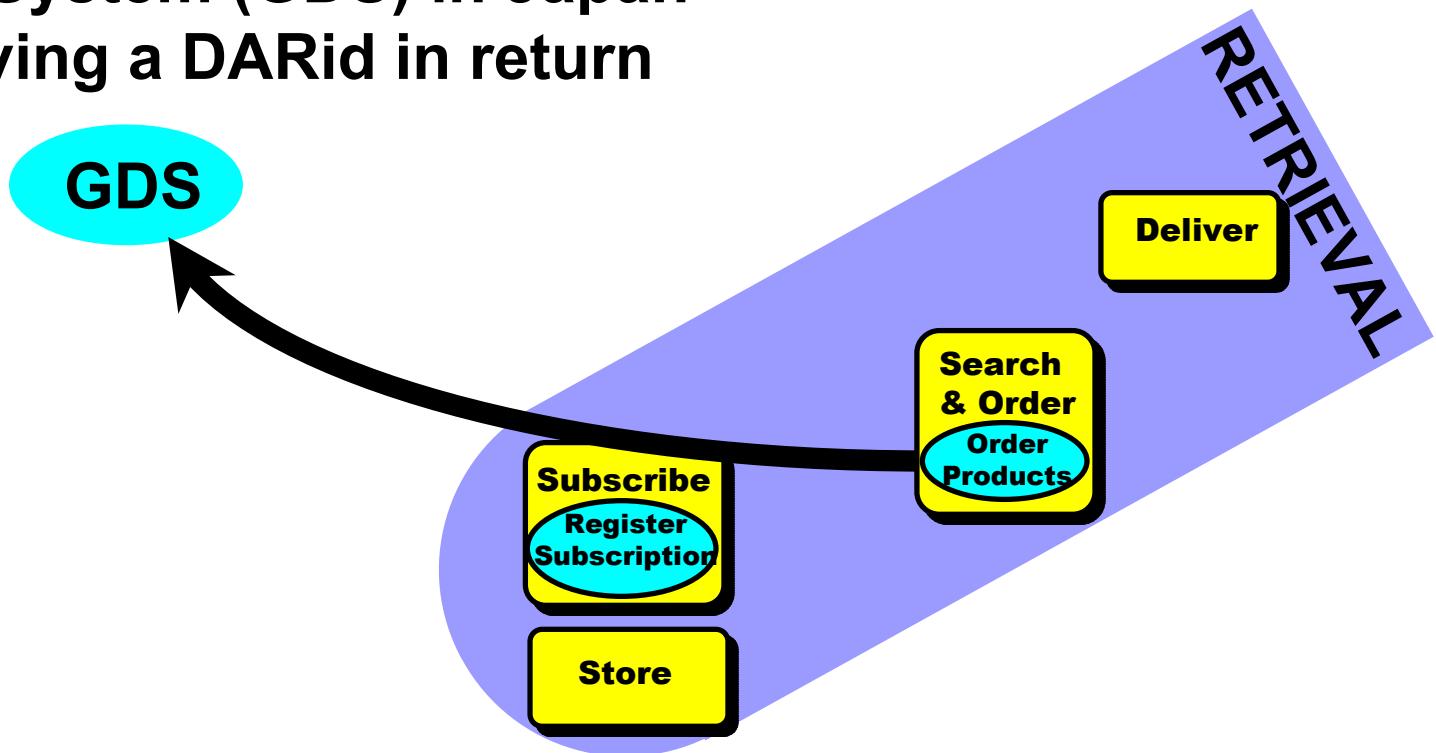
# ASTER: CSCI/Component Role in Client Request





# DAR Support (Cont.)

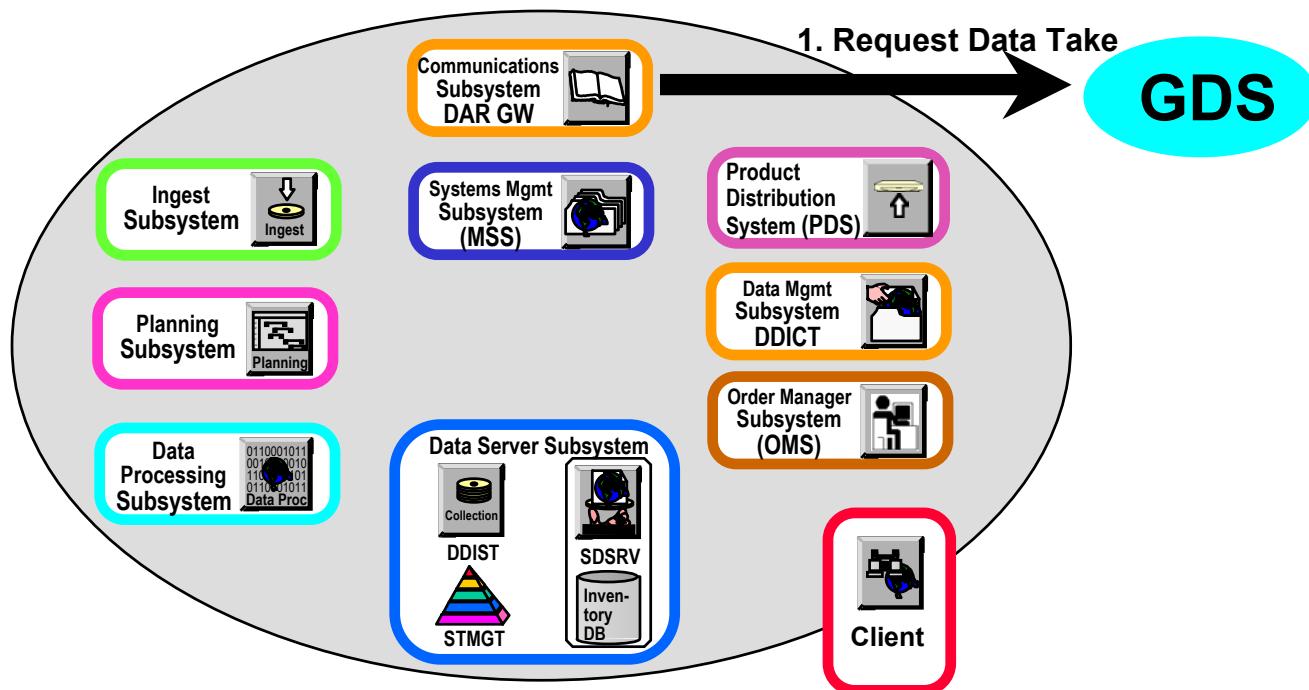
ECS submits DAR to ASTER Ground Data System (GDS) in Japan receiving a DARid in return



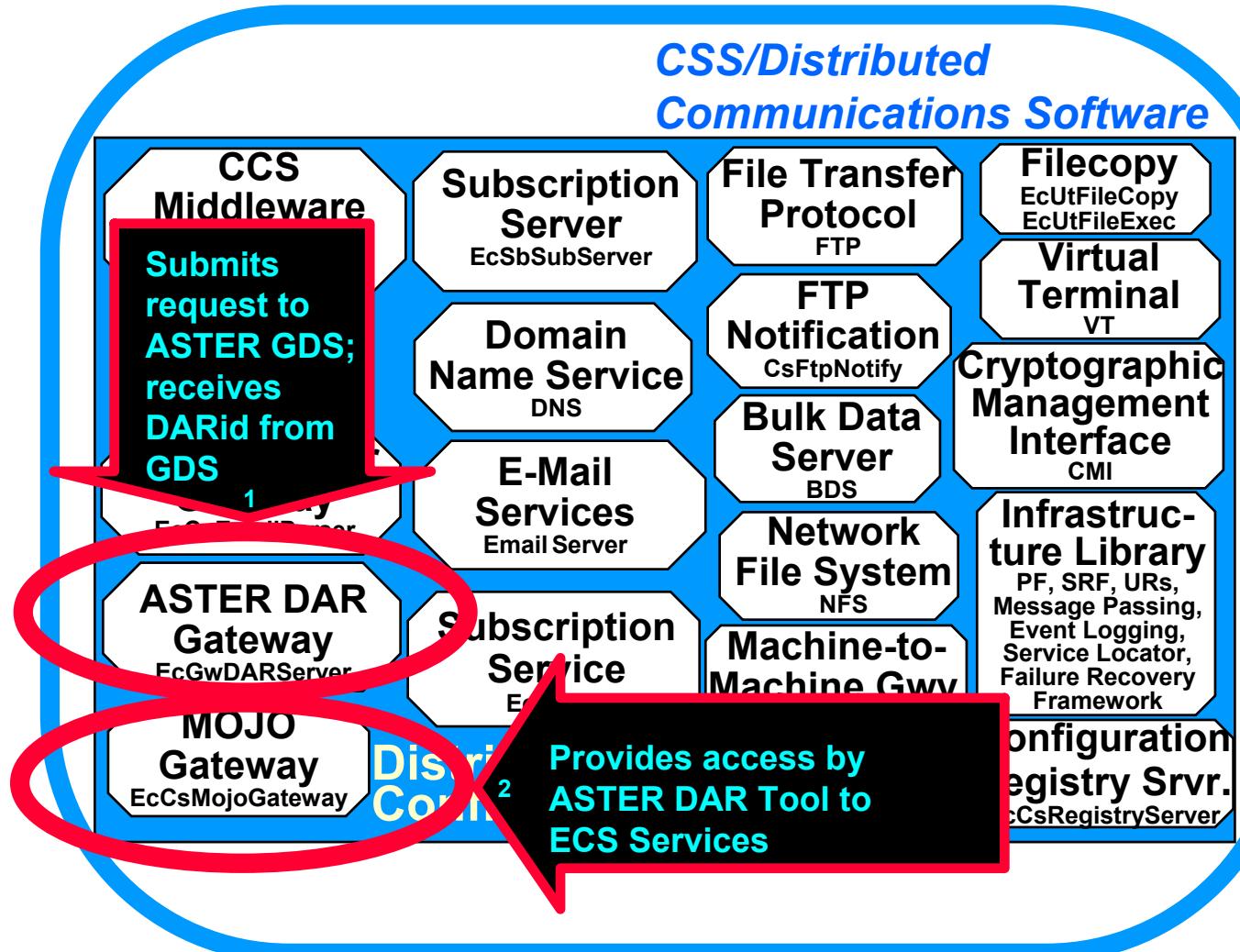
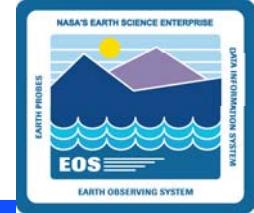


# ASTER: Request Data Take Process

ASTER DAR Gateway submits a request for a data take over the area of interest. GDS responds with a DARid.



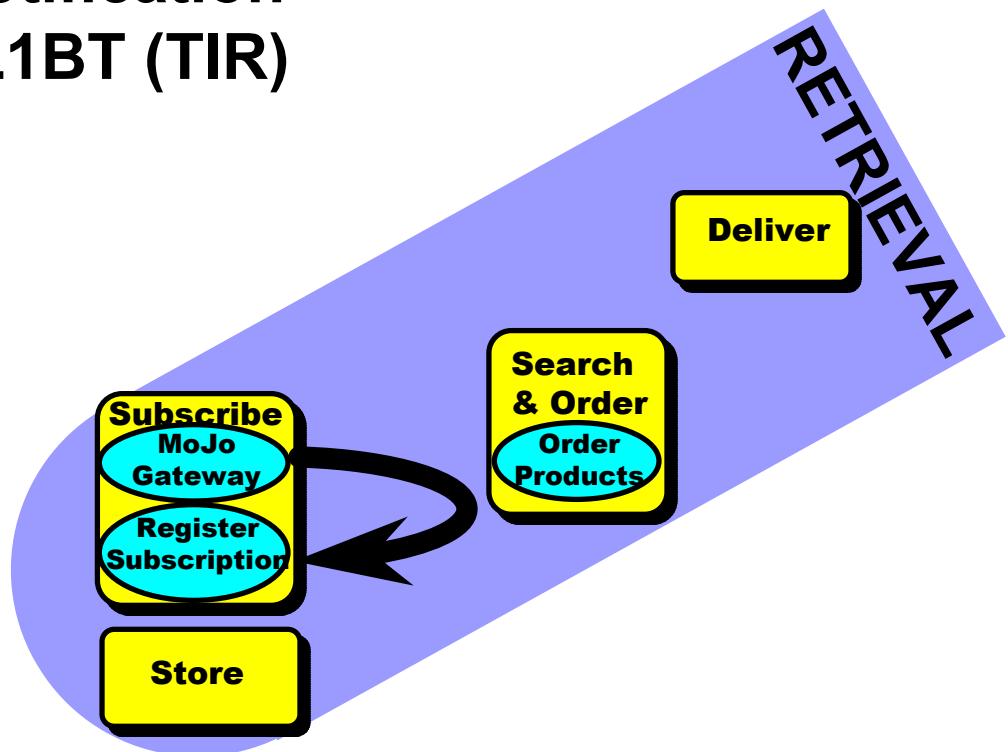
# ASTER: CSCI/Component Role in Data Take Request



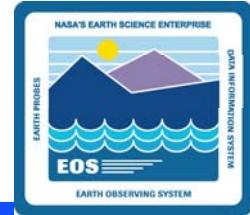


# DAR Support (Cont.)

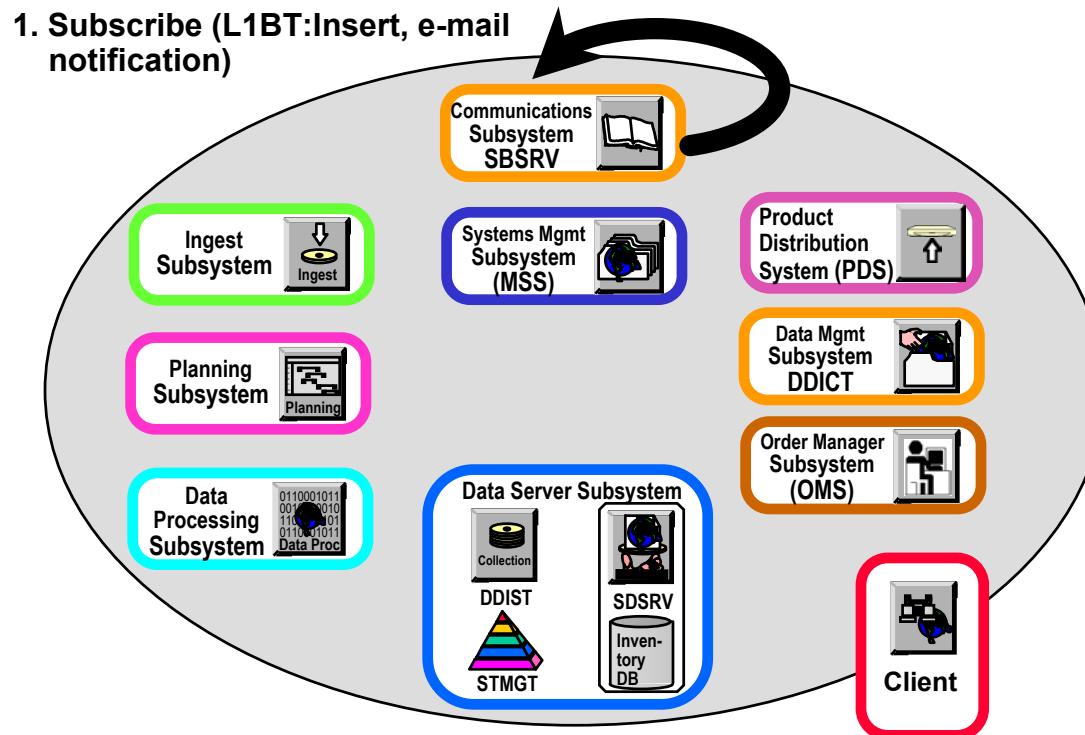
**Subscription is submitted on behalf of user for notification on receipt of AST\_L1BT (TIR) data**



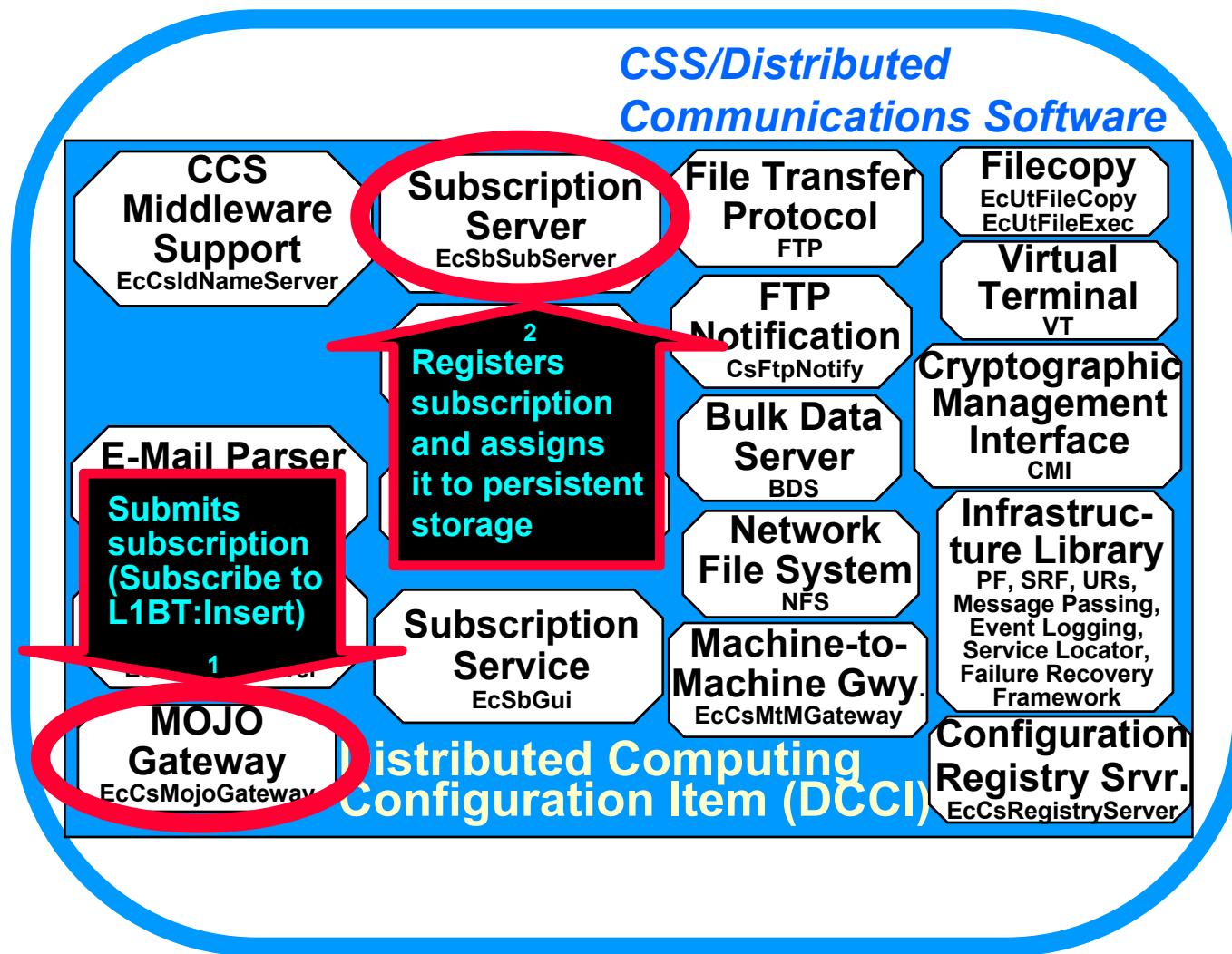
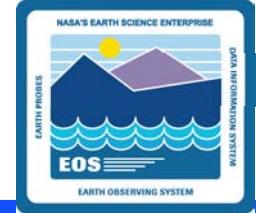
# ASTER: Submit Subscription Process

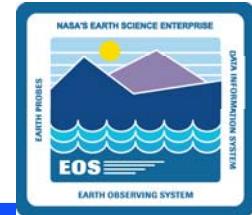


MoJo Gateway submits subscription for notification on the occurrence of AST\_L1BT:Insert event, qualified with the DARid.



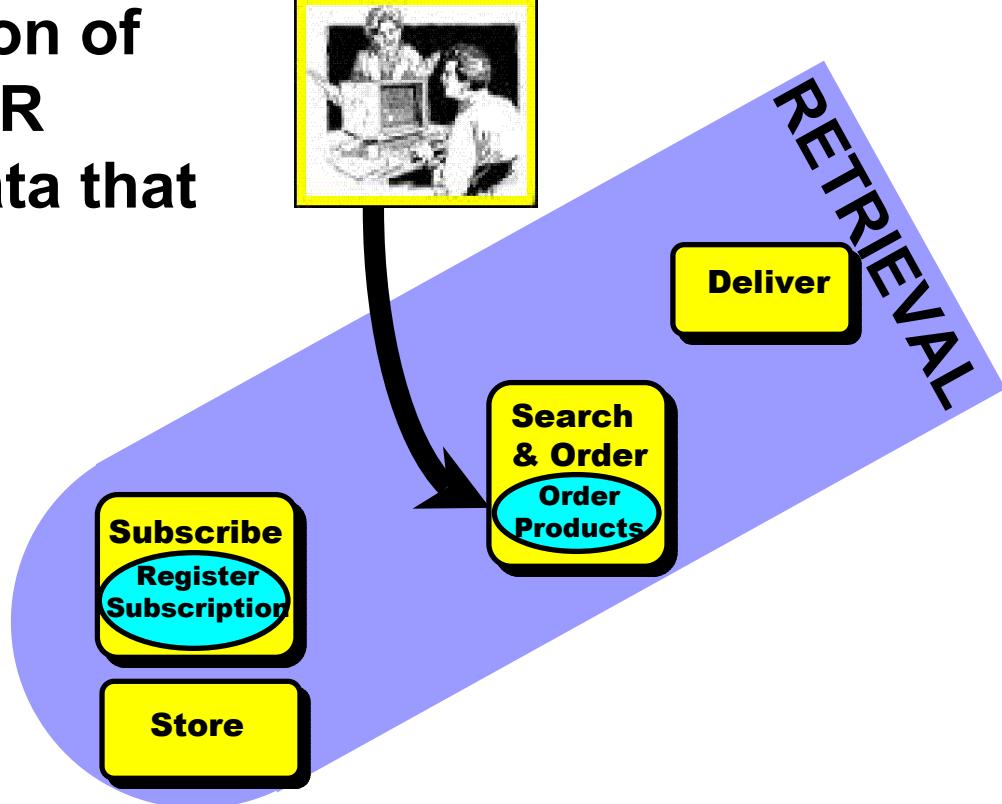
# ASTER: CSCI/Component Role in Subscription Submission



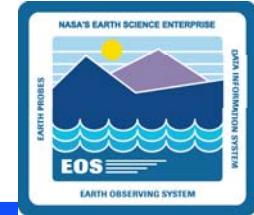


# DAR Support (Cont.)

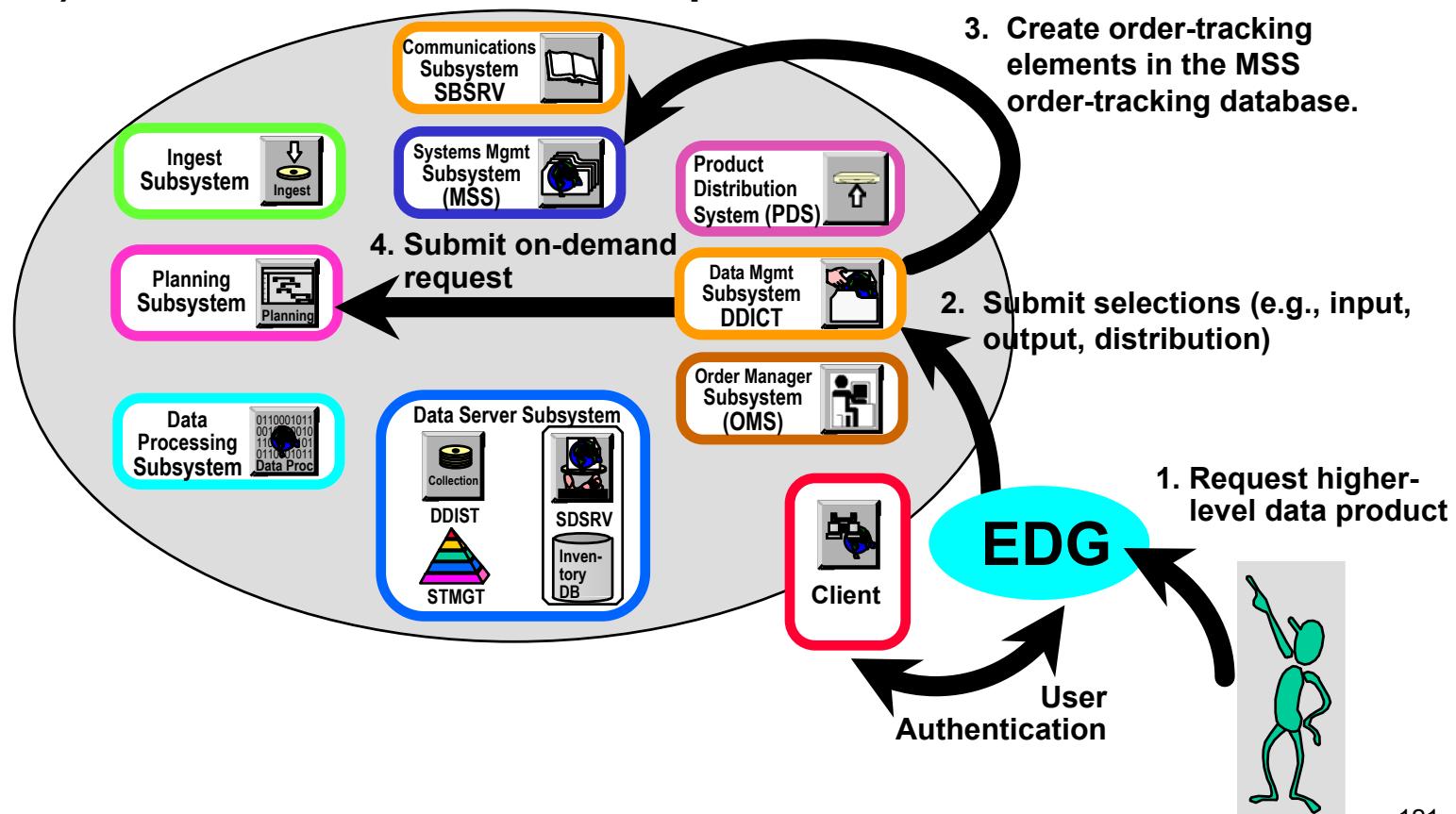
ASTER Scientist decides to request production of a higher level ASTER product from the data that are to be collected



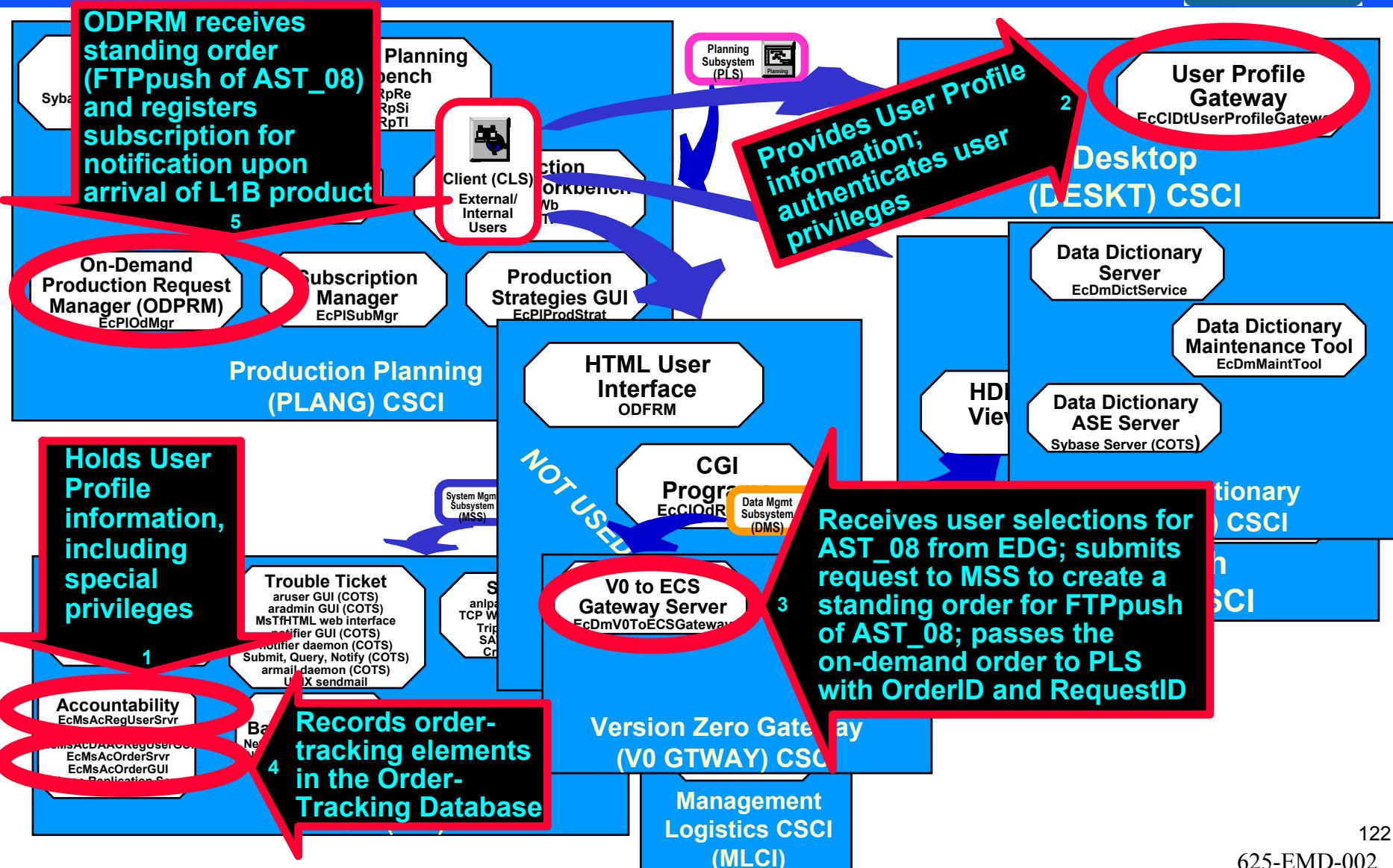
# ASTER: On-Demand Data Processing Request Process



ASTER Scientist wants AST\_08 (L2 Surface Temperature product) based on the AST\_L1BT (TIR - Thermal InfraRed - product) resulting from GDS initial processing of the data collected for the DAR, and uses the EOS Data Gateway (EDG) Web Client to submit the request.



# ASTER: CSCI/Component Role in On-Demand Request

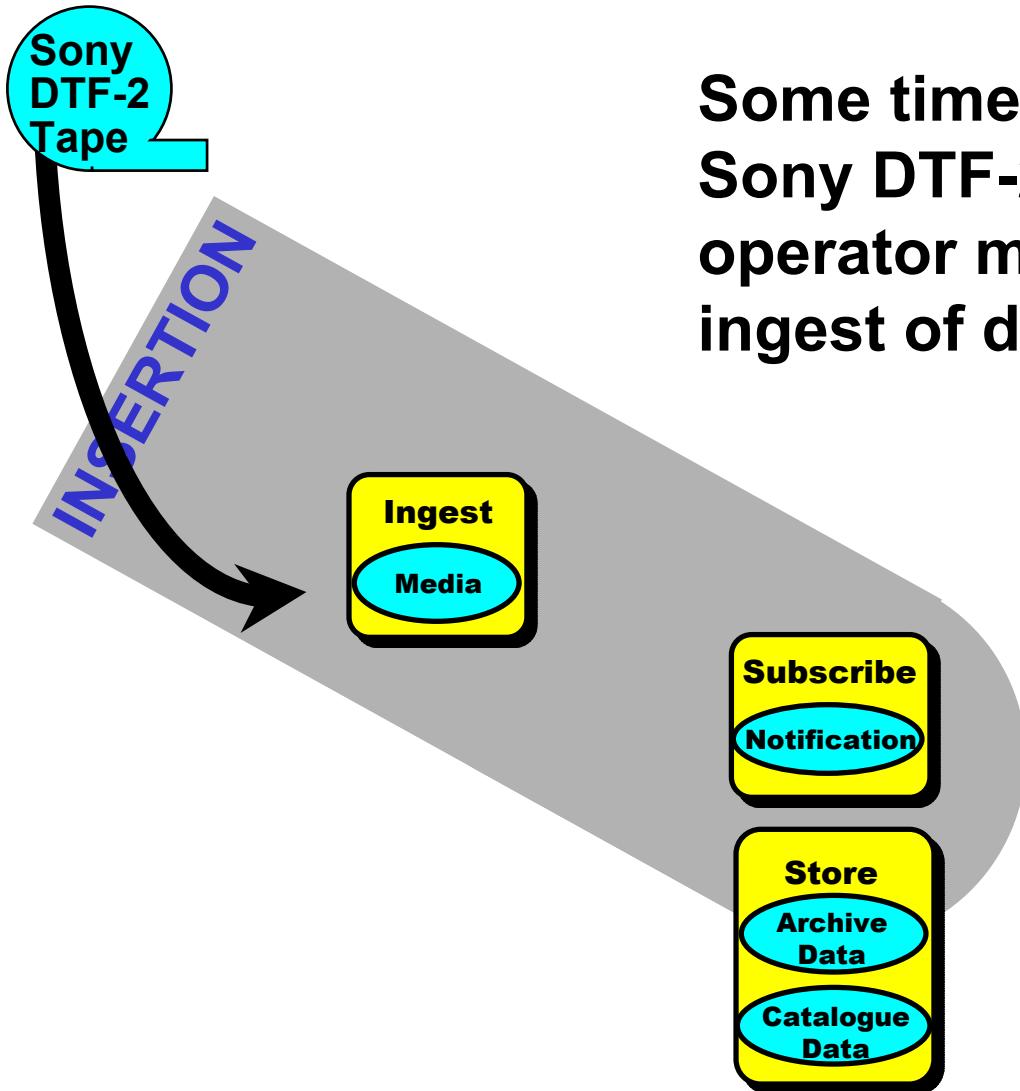
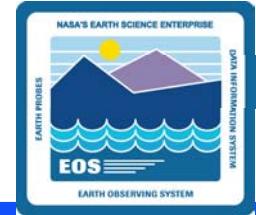


# ASTER Scenario: Chaining and On-Demand Production



**Data Insertion**  
**Data Notification**  
**On-demand Production**  
**Standing Order Delivery**  
**QA Update**

# Chaining and On-Demand Production (Cont.)

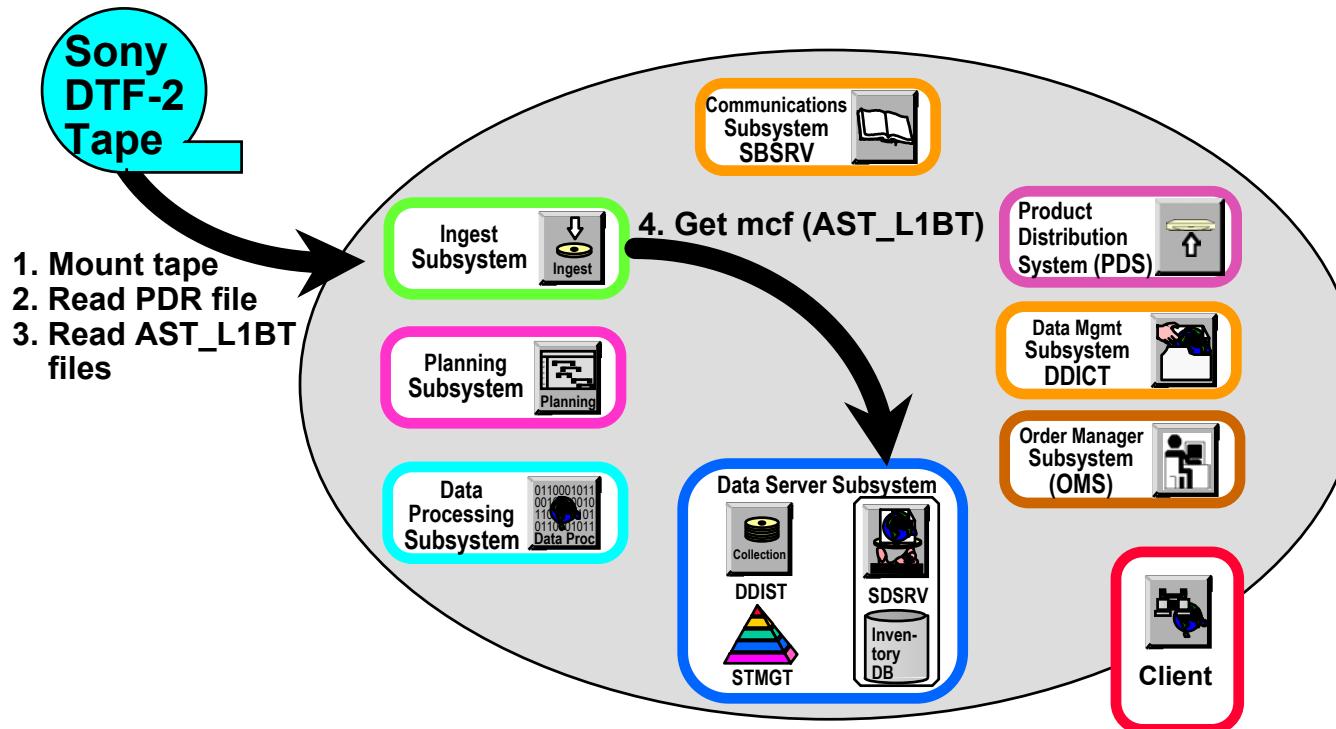


Some time later, after receiving Sony DTF-2 tape from GDS, operator mounts tape and begins ingest of data

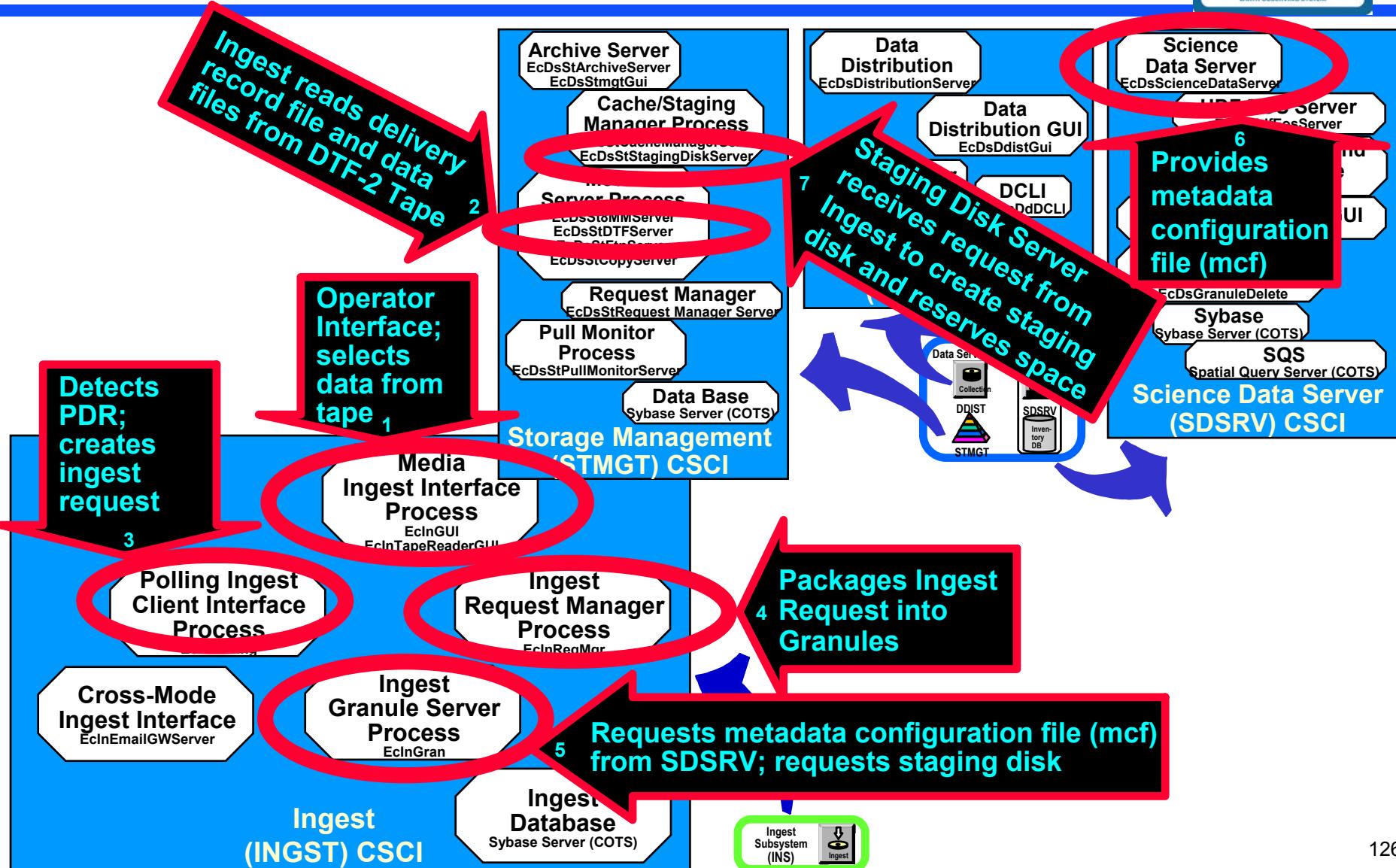


# ASTER: DTF-2 Tape Ingest Process

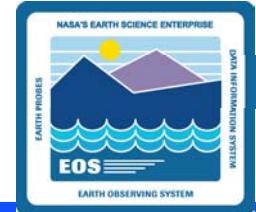
After receiving Sony DTF-2 tape in a shipment, DAAC Operator mounts tape and begins ingest activities.  
Tape contains AST\_L1BT (L1B TIR) data.



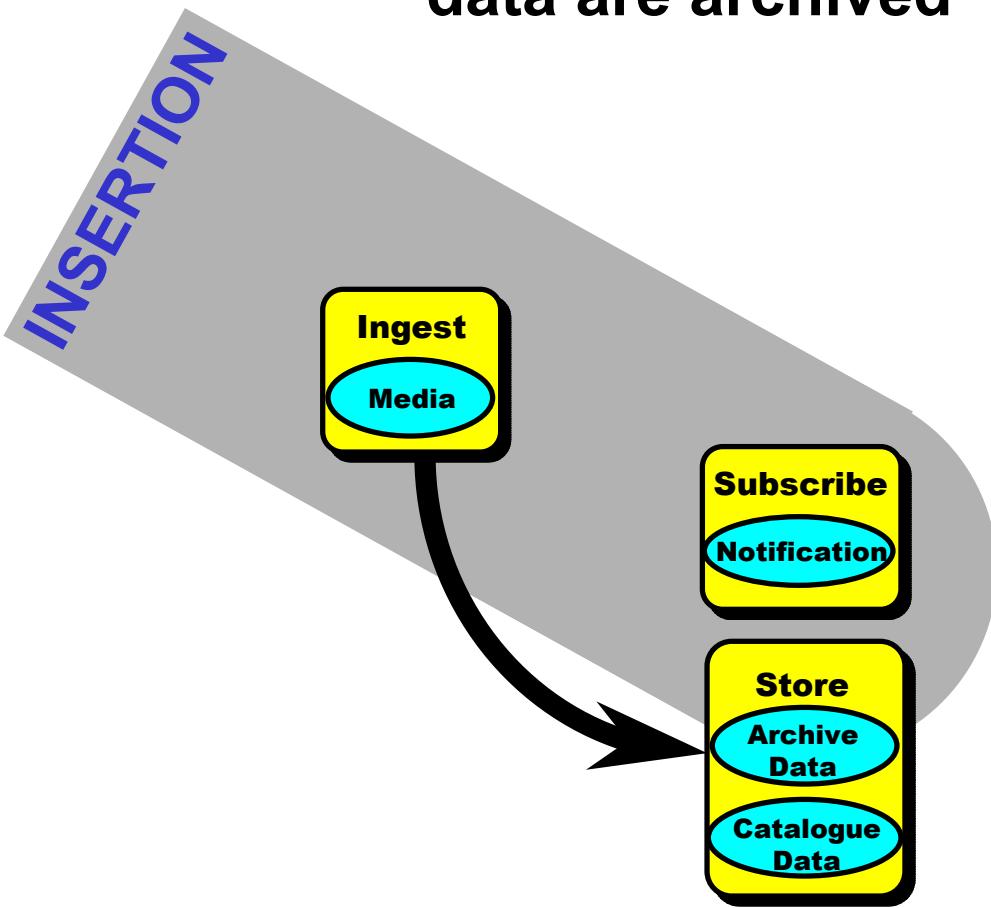
# ASTER: CSCI/Component Role in Ingest DTF-2 Tape Operations



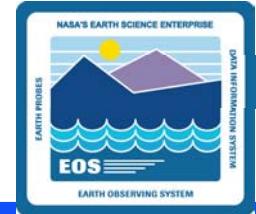
# Chaining and On-Demand Production (Cont.)



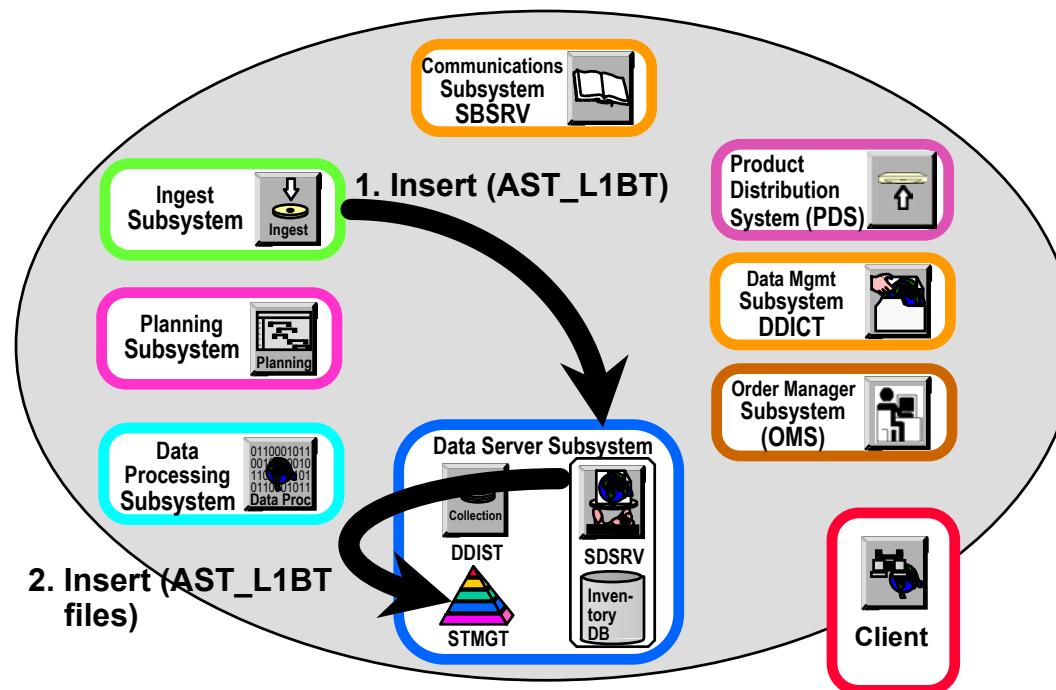
Ingested AST\_L1BT  
data are archived



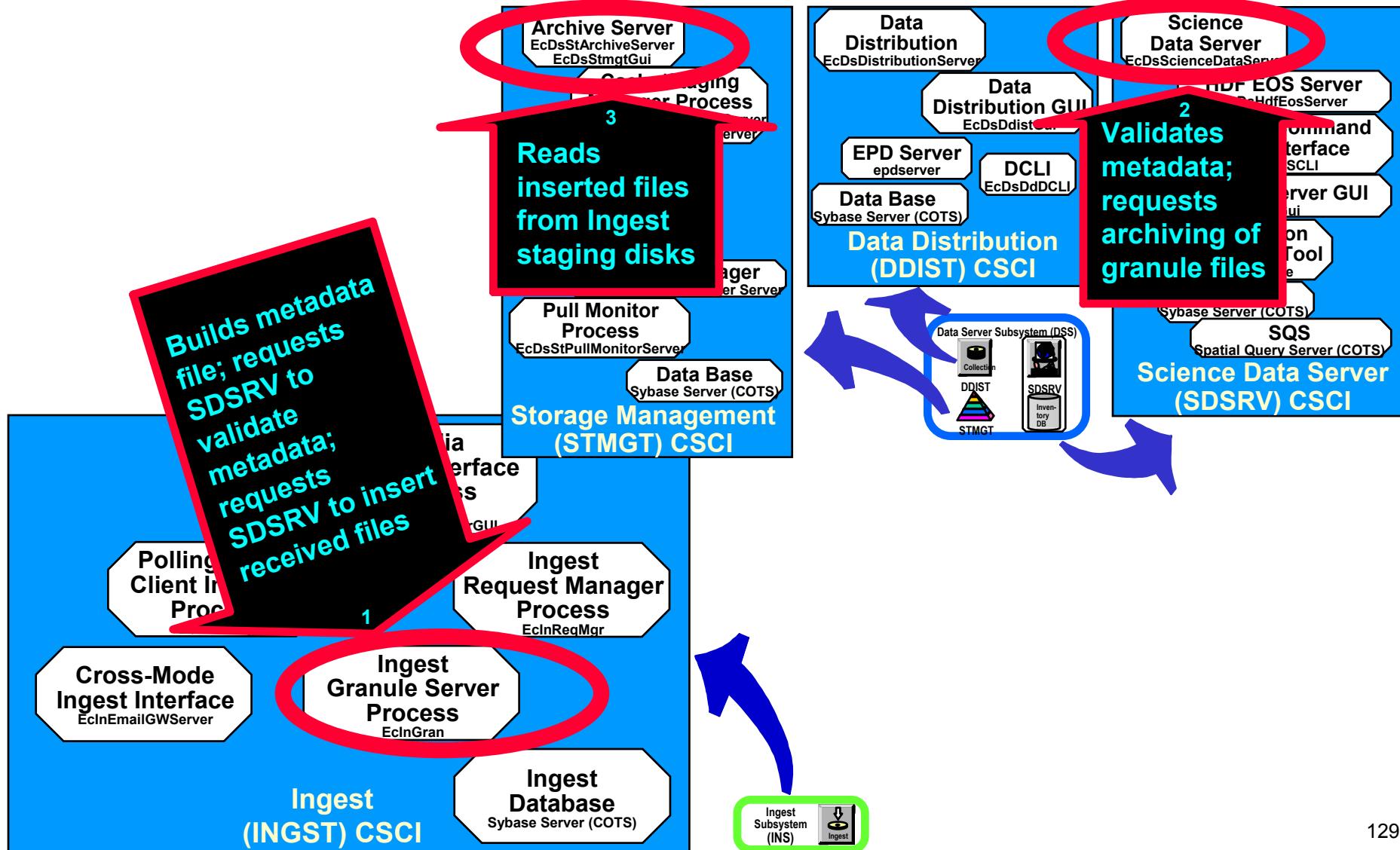
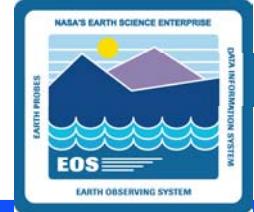
# ASTER: Ingest Archive Insertion Process



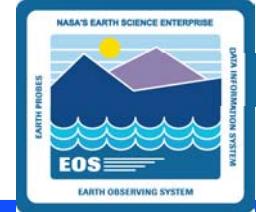
Archive AST\_L1BT (L1B TIR) data granules.



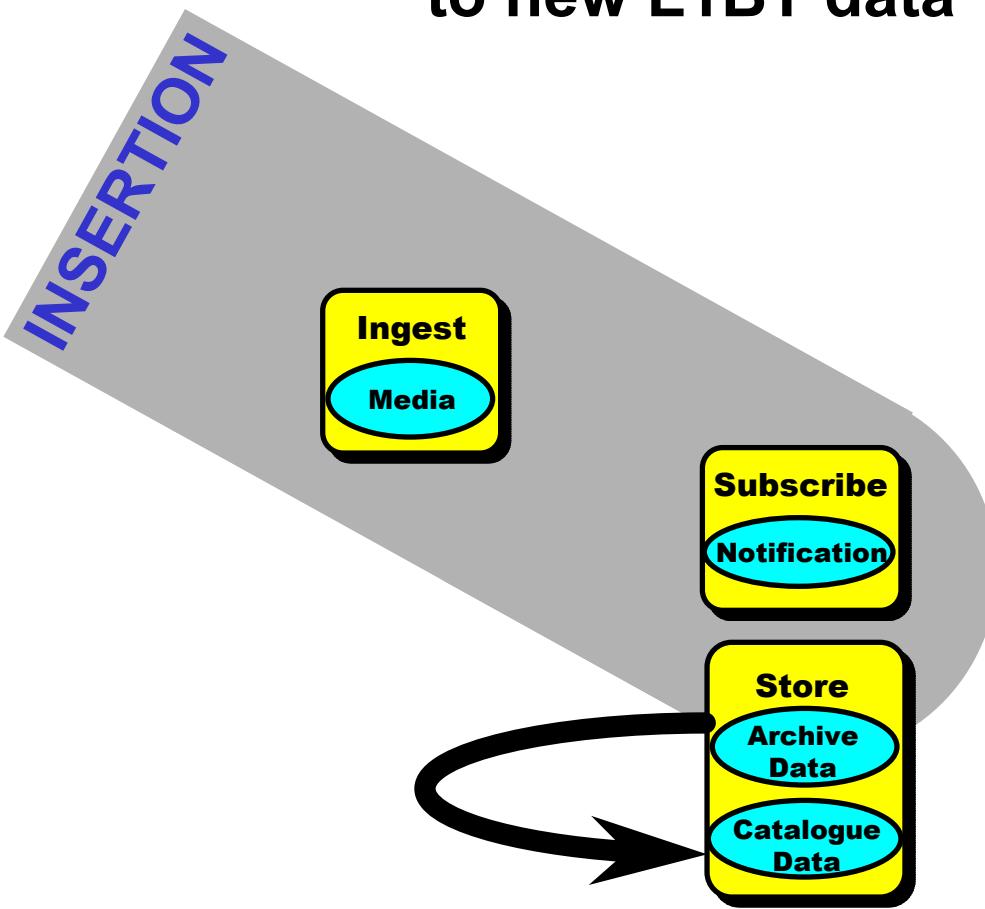
# ASTER: CSCI/Component Role in Ingest Archive Insertion



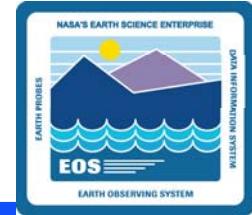
# Chaining and On-Demand Production (Cont.)



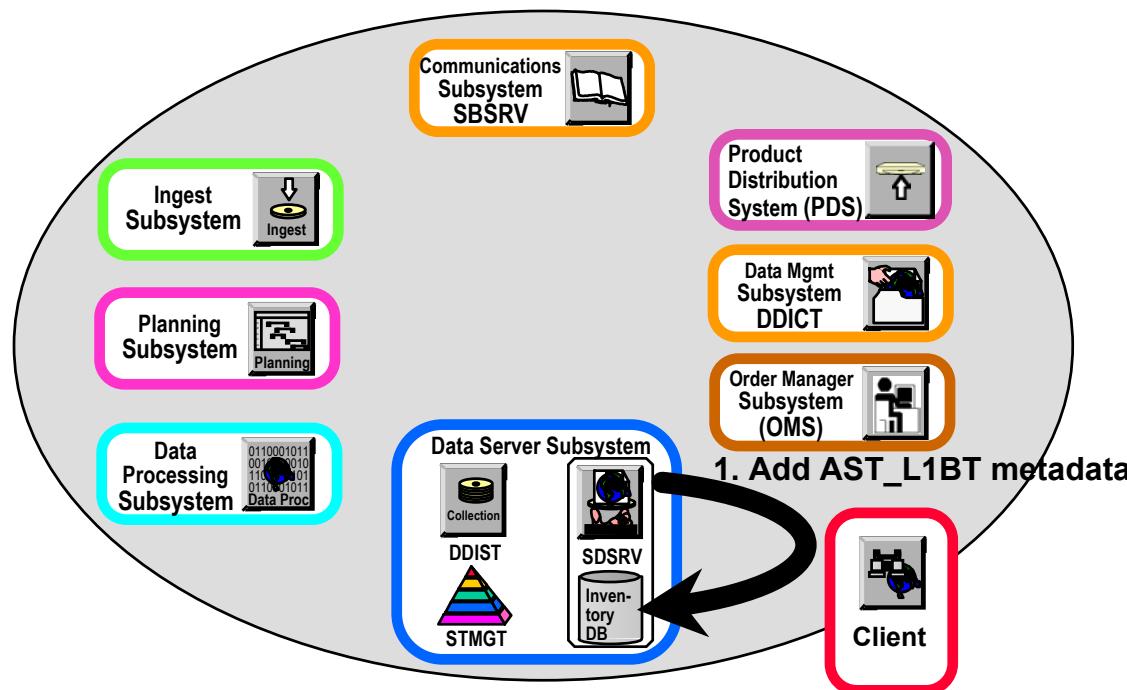
Update catalogue with reference  
to new L1BT data



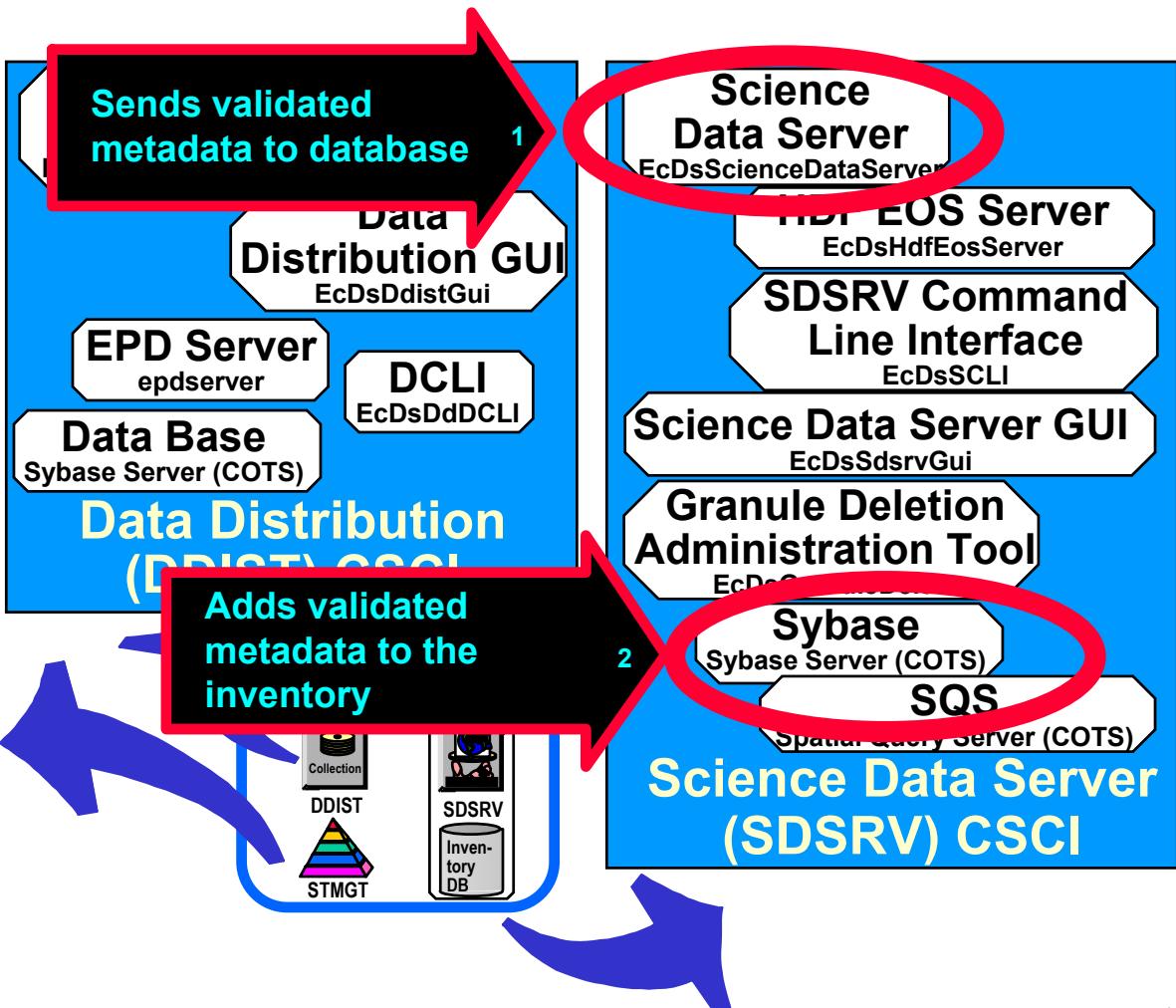
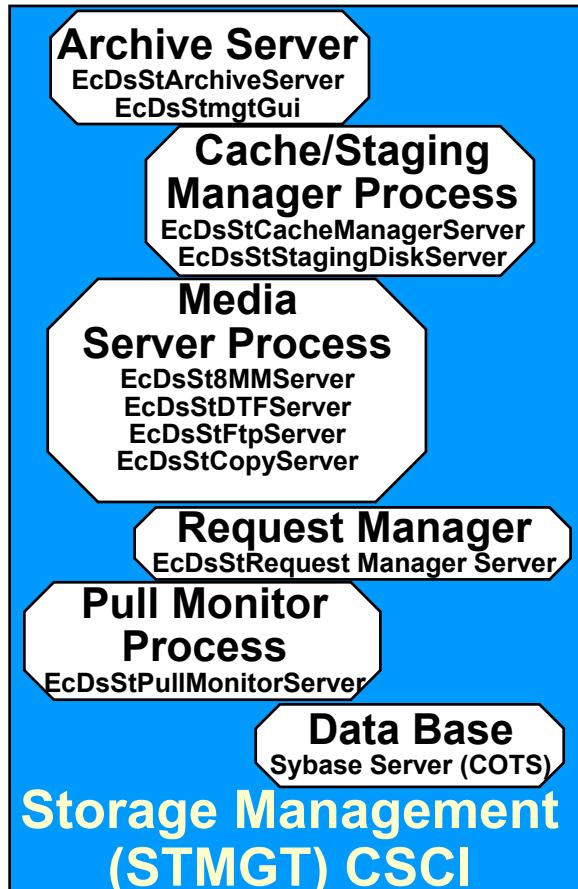
# ASTER: Inventory (Metadata) Update Process



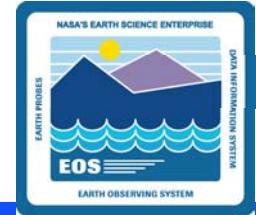
Add metadata for AST\_L1BT (L1B TIR) data granules to the Sybase/SQS database.



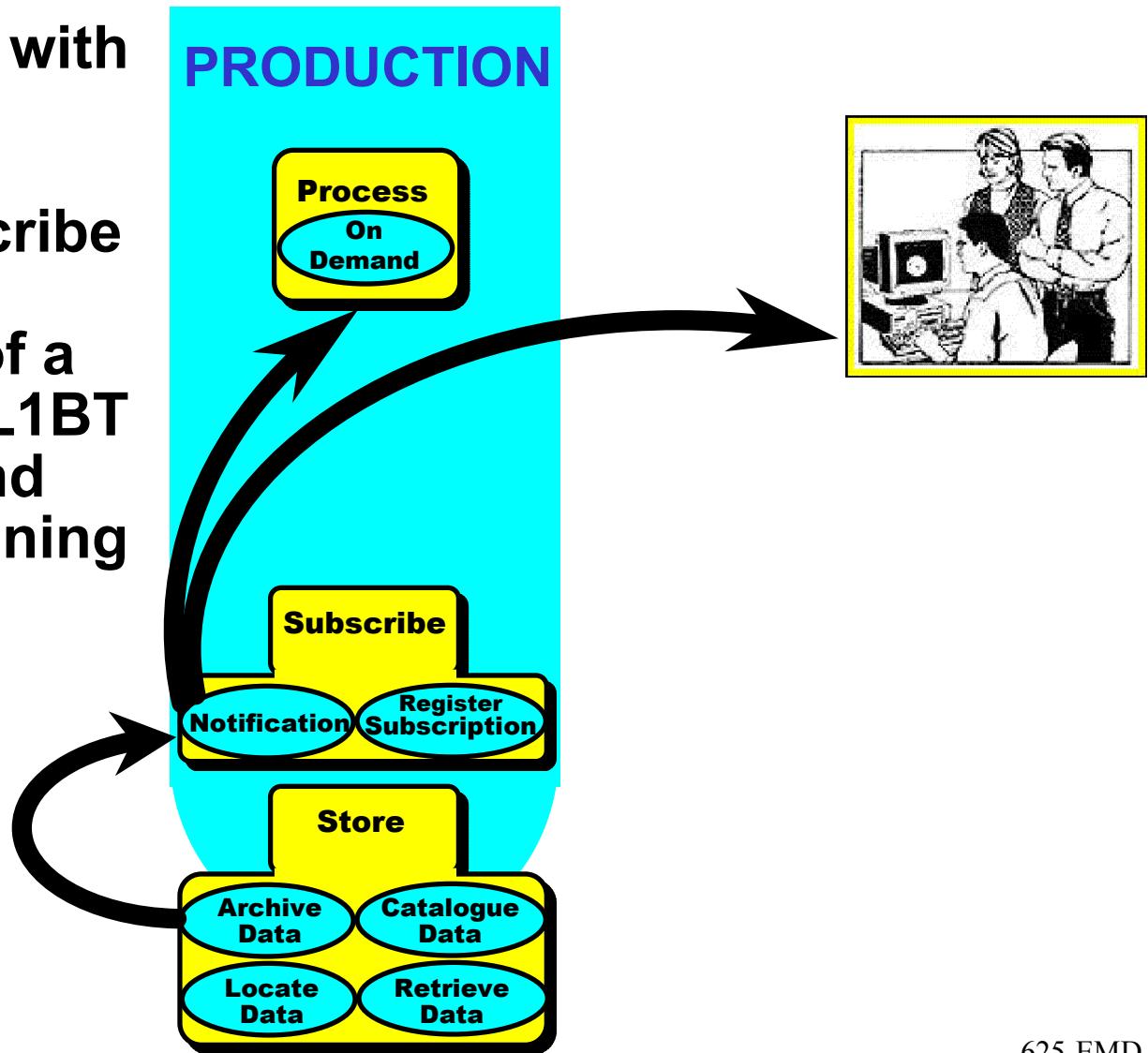
# ASTER: CSCI/Component Role in Inventory (Metadata) Update



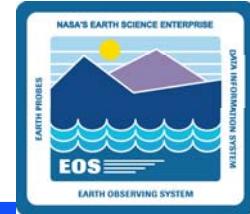
# Chaining and On-Demand Production (Cont.)



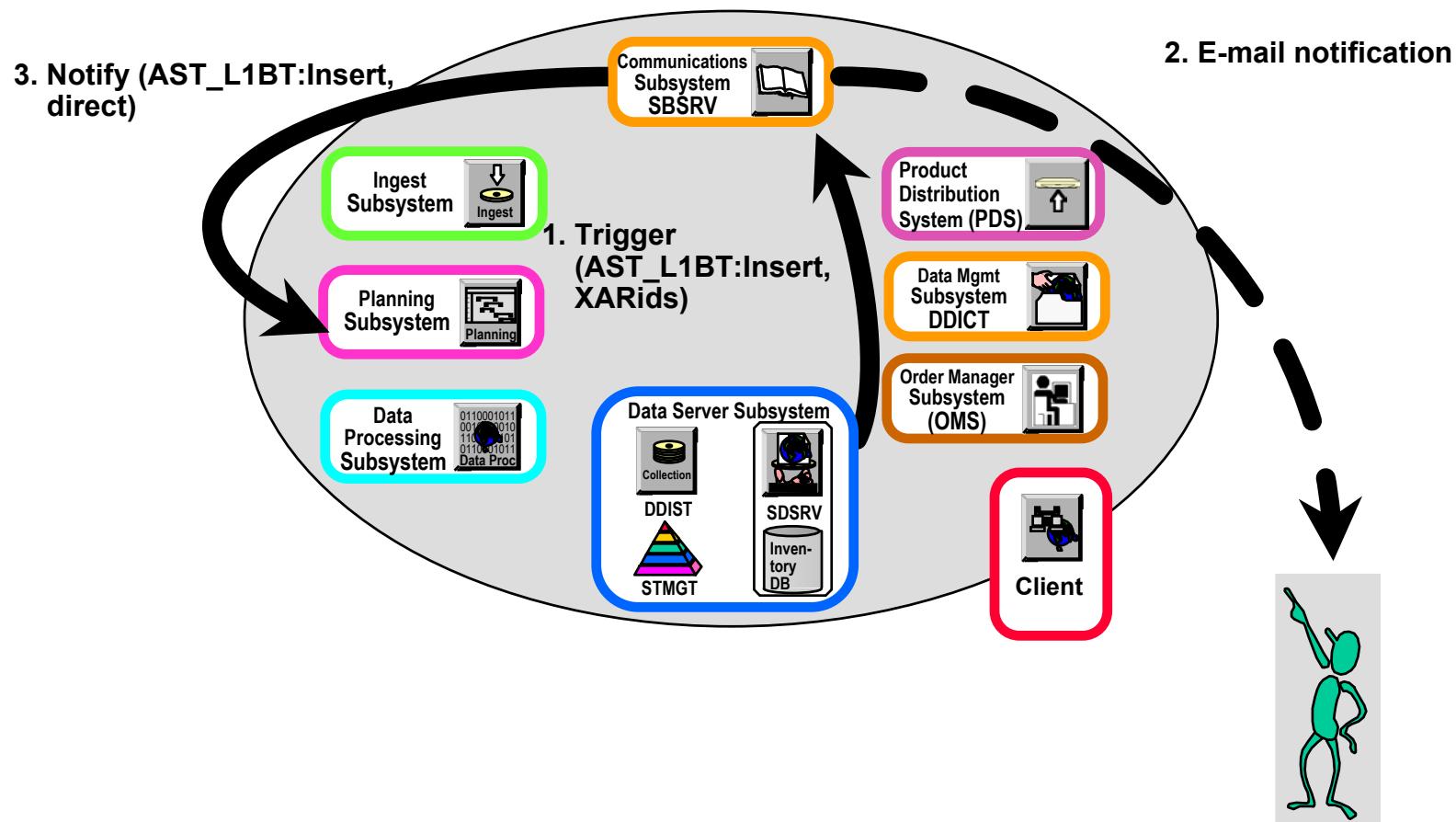
Insert terminates with an insert event notification to Subscribe. Subscribe e-mails ASTER Scientist notice of a completed AST\_L1BT granule insert, and also notifies Planning



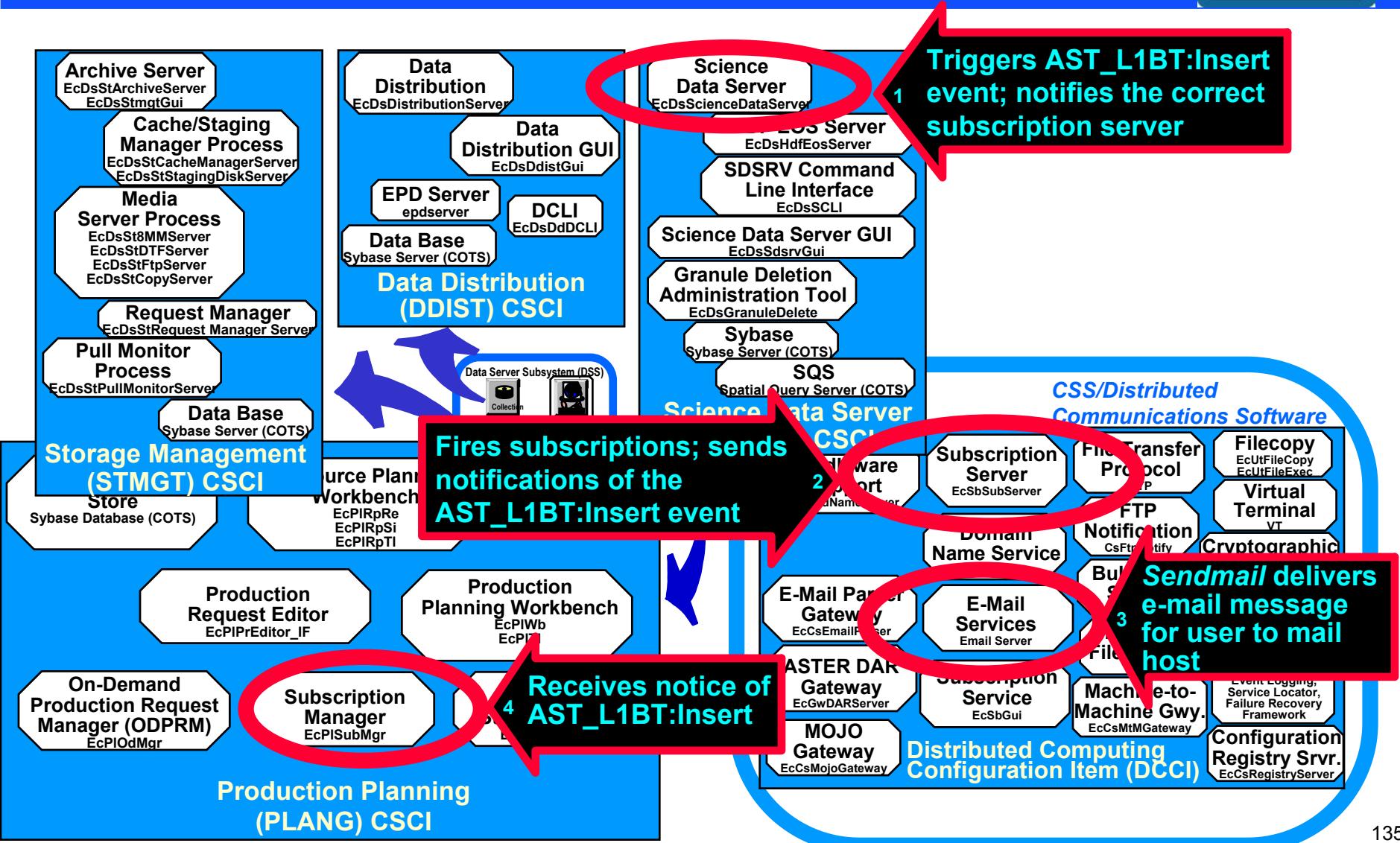
# ASTER: Event Notification Process



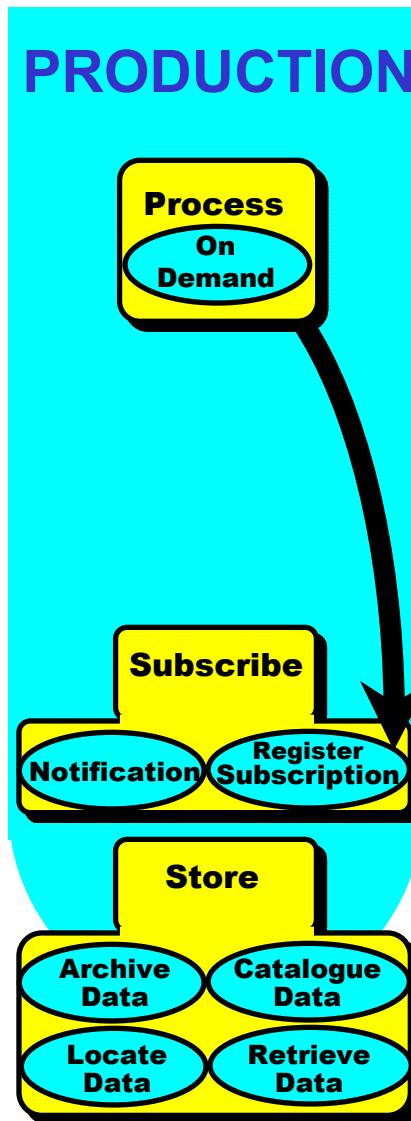
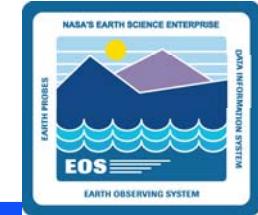
Notify all AST\_L1BT:Insert event subscribers whose DARid numbers are matched with the ingested granules.



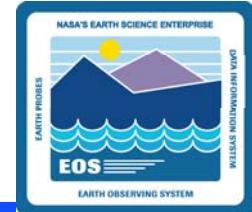
# ASTER: CSCI/Component Role in Event Notification



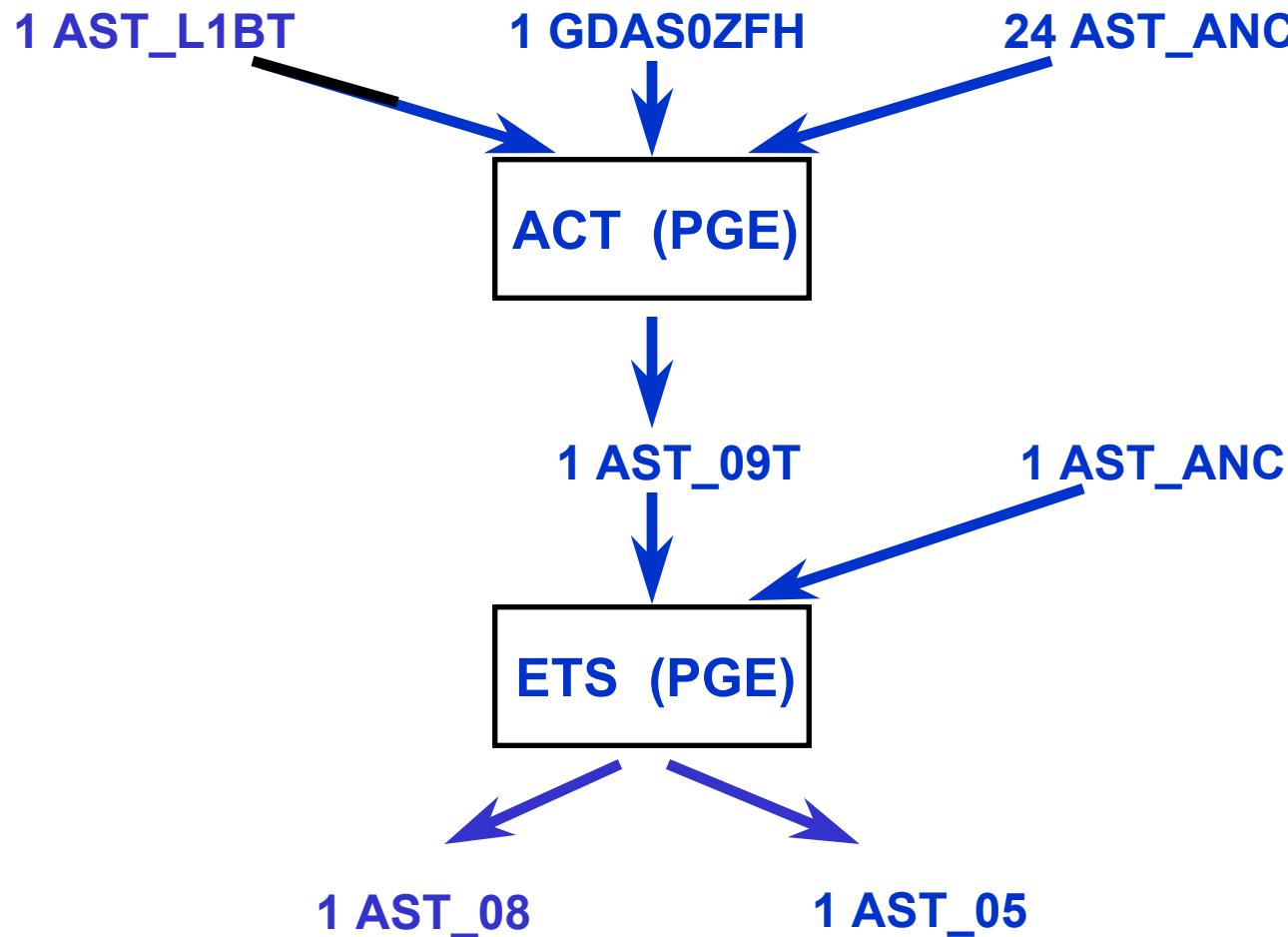
# Chaining and On-Demand Production (Cont.)



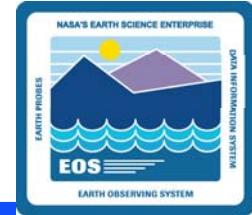
Planning recognizes the need to run ACT PGE before ETS. Creates data processing requests (DPRs) for ACT and ETS, and registers subscriptions for input products that are not available in the archive.



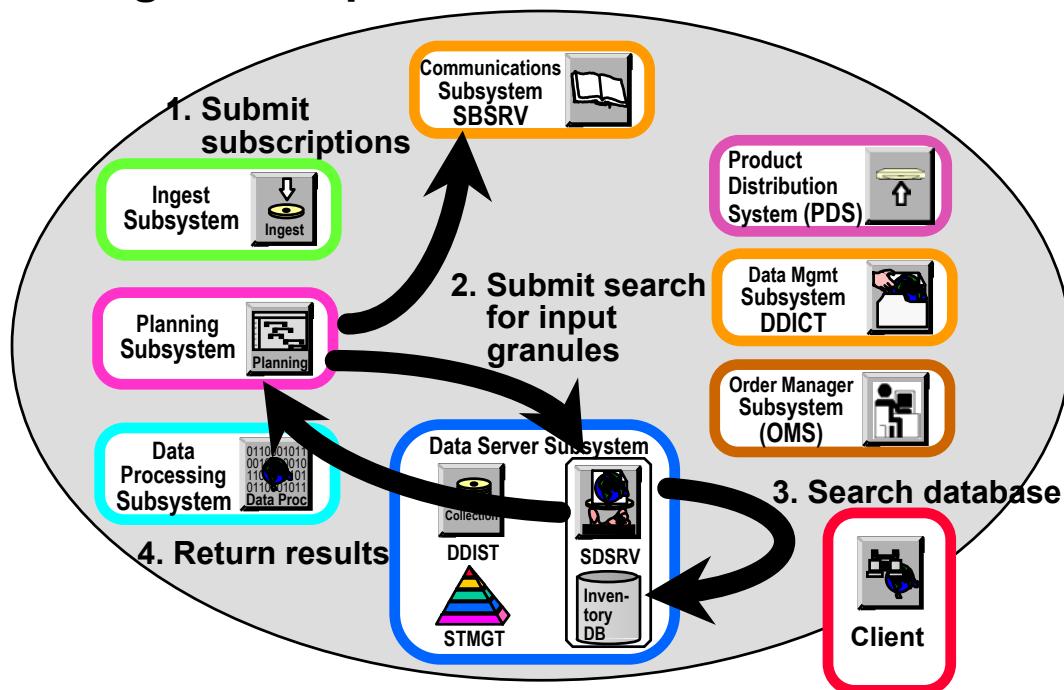
# ASTER: PGE Chaining



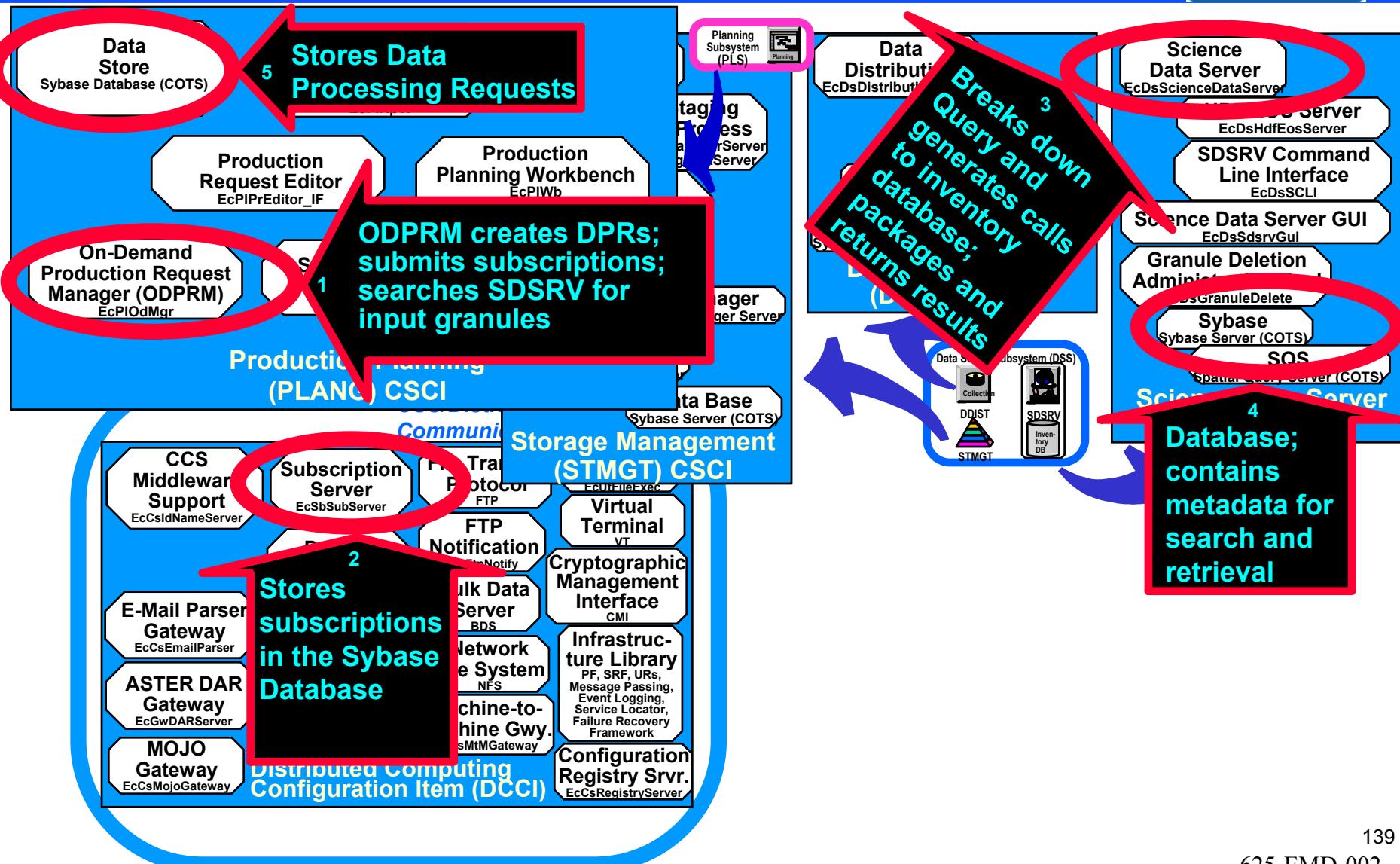
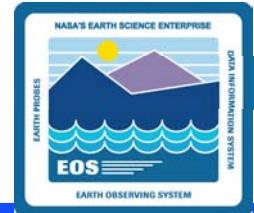
# ASTER: Sequenced Production Request Process



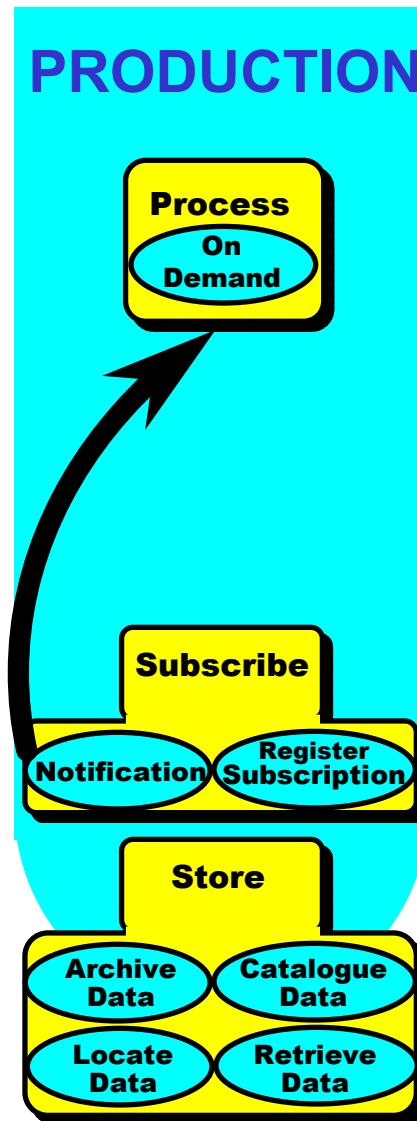
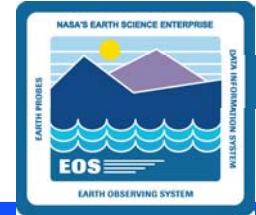
Planning recognizes that, in order to run ETS algorithm on AST\_L1BT (L1B TIR), ACT algorithm must be run first. Planning creates DPRs for ACT and ETS, with the AST\_09T (L2 Surface Radiance TIR) output feeding the ETS algorithm, submitting subscriptions for data not available in the archive.



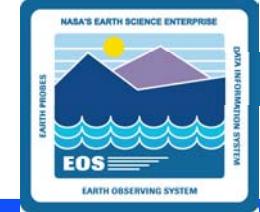
# ASTER: CSCI/Component Role in Sequenced Production Request



# Chaining and On-Demand Production (Cont.)

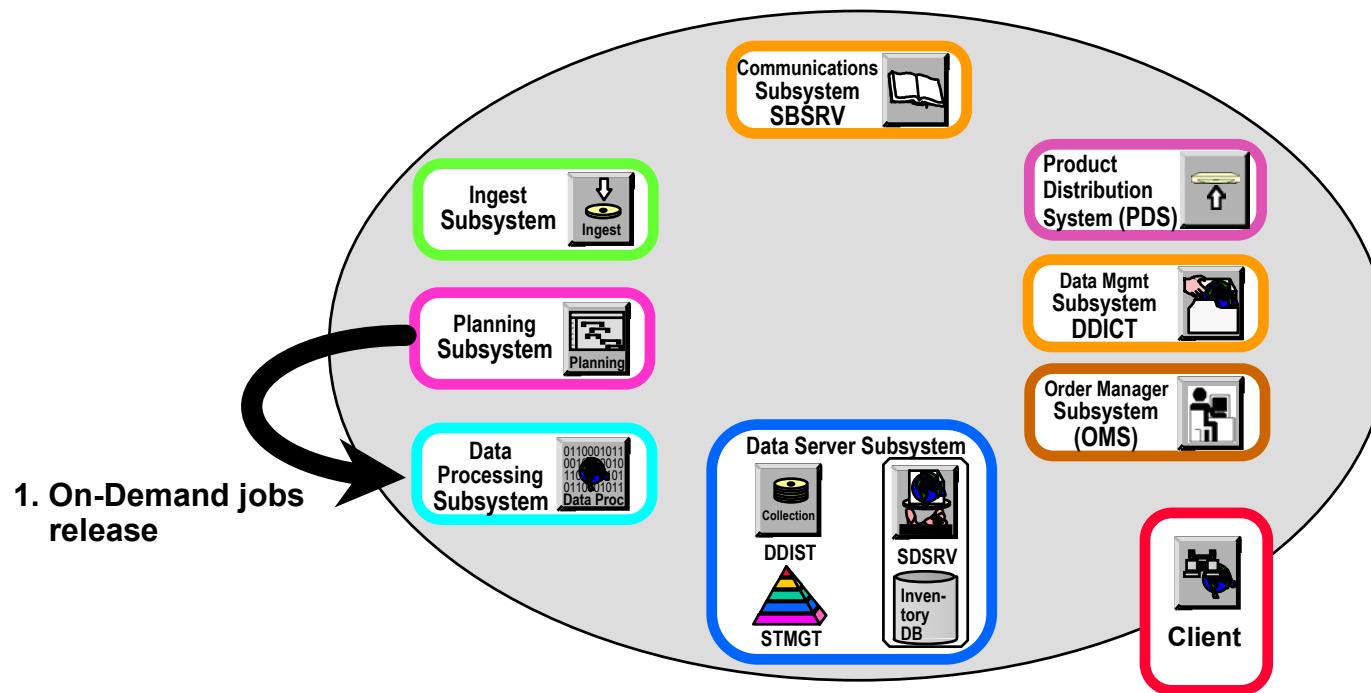


Planning releases the On-Demand jobs, including the DPR for ACT and a dependent one for ETS

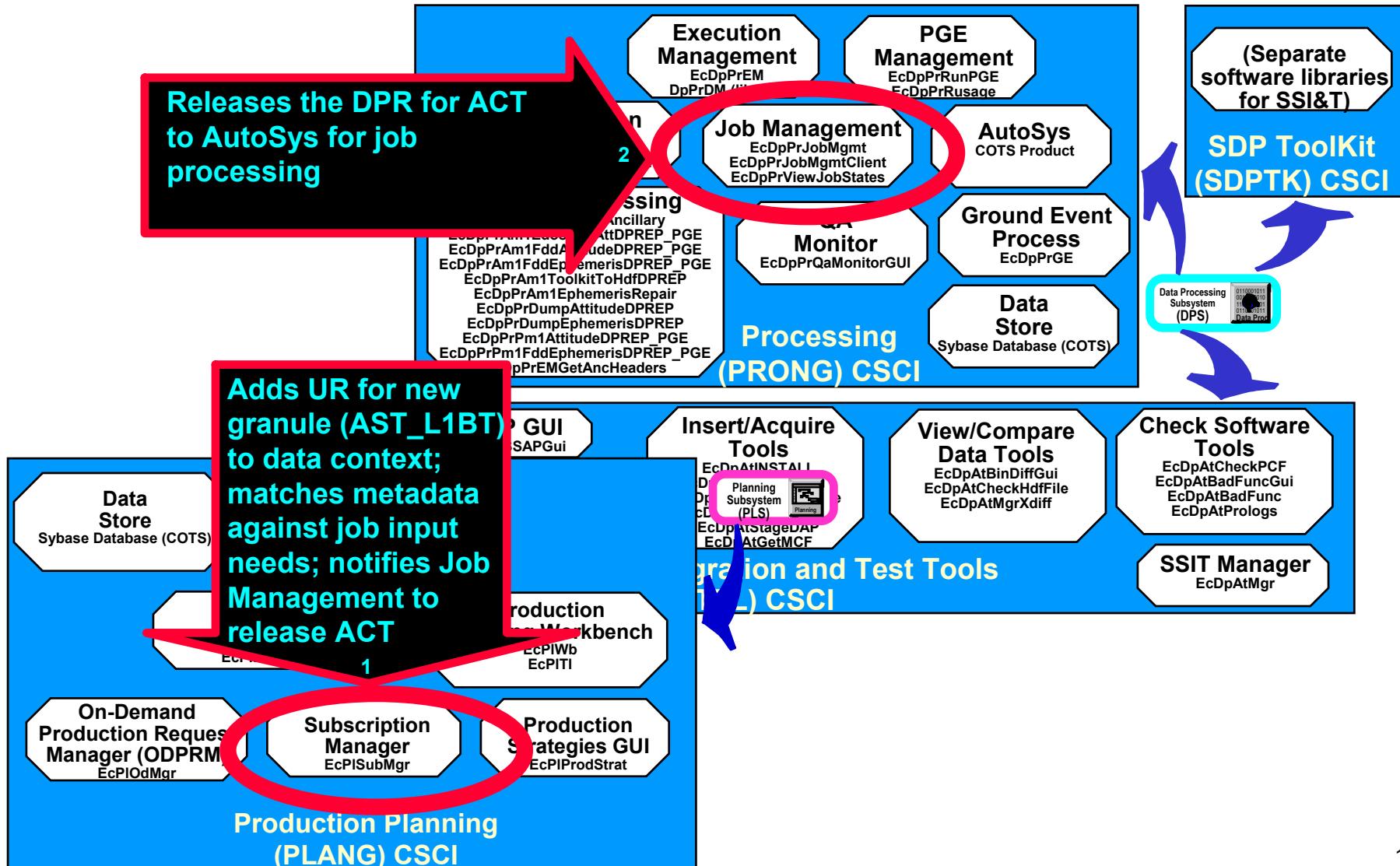
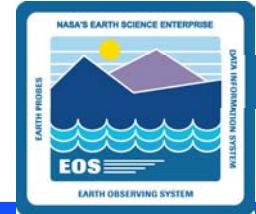


# ASTER: Job Activation Process

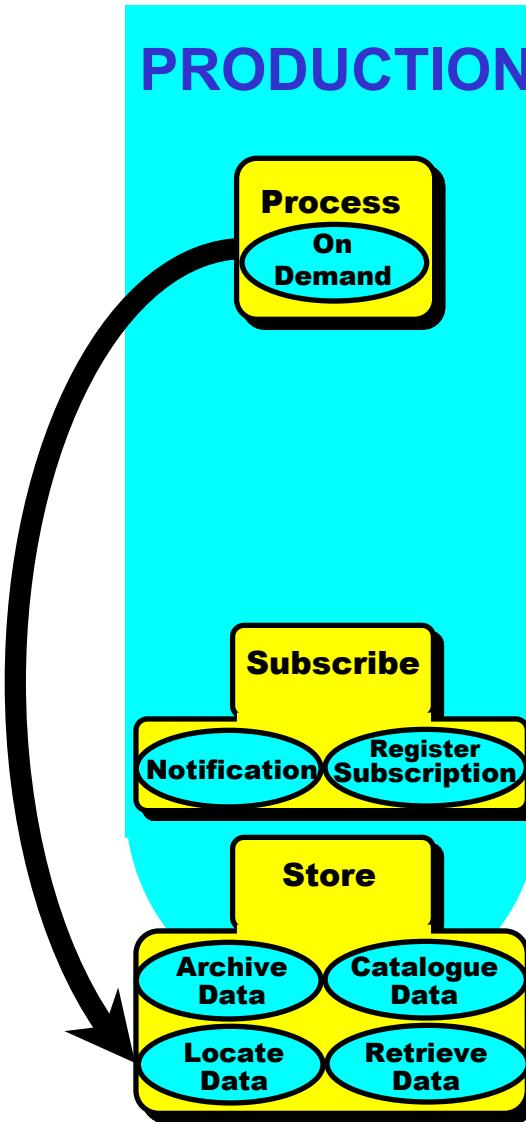
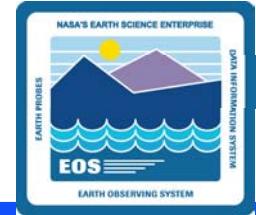
Planning releases the On-Demand jobs; the release activates the ACT DPR for processing.



# ASTER: CSCI/Component Role in Job Activation

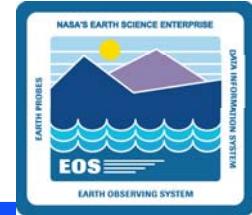


# Chaining and On-Demand Production (Cont.)

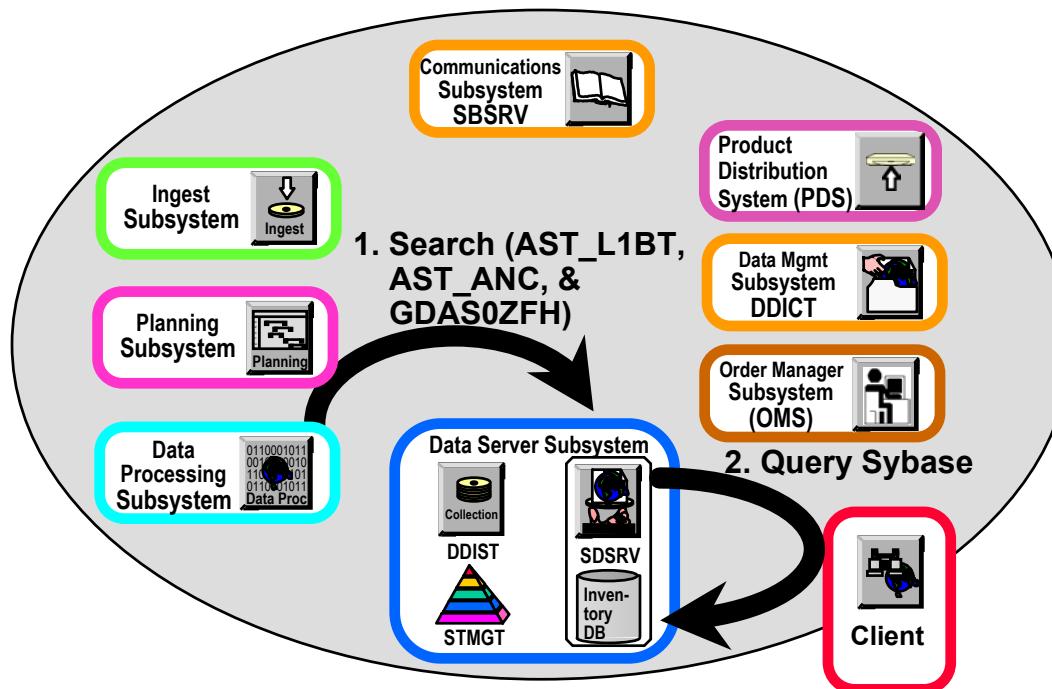


Job locates  
AST\_L1BT,  
AST\_ANC  
(ASTER ancillary  
data set), and  
GDAS0ZFH  
(NCEP ancillary)  
data required for  
ACT algorithm

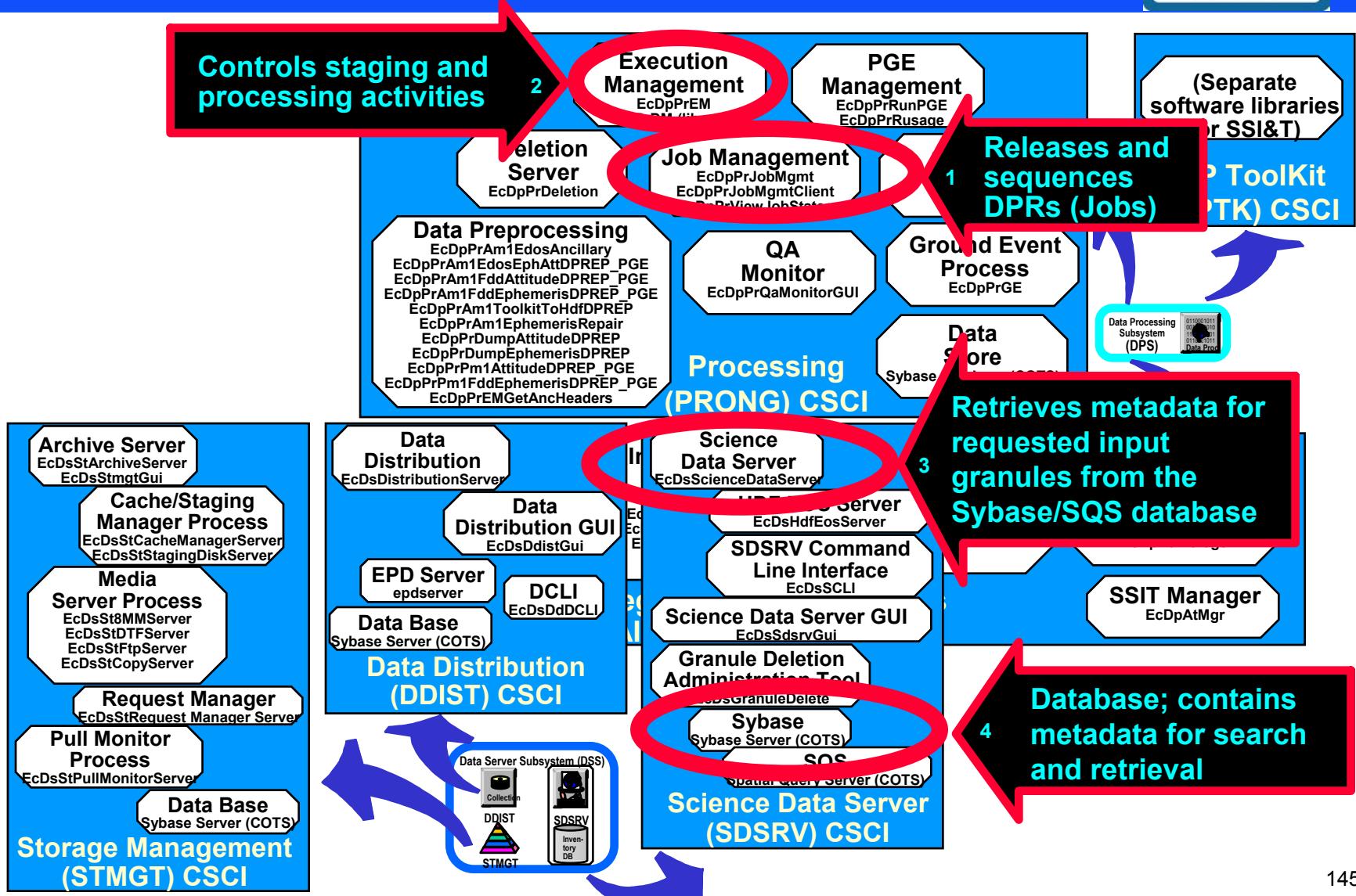
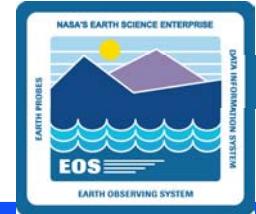
# ASTER: Input Data Location Process



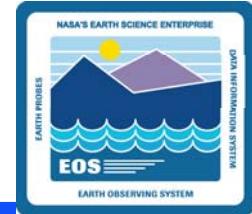
ACT locates required AST\_L1BT (L1B TIR), AST\_ANC (ASTER ancillary data set), and GDAS0ZFH (NCEP ancillary) input data granules.



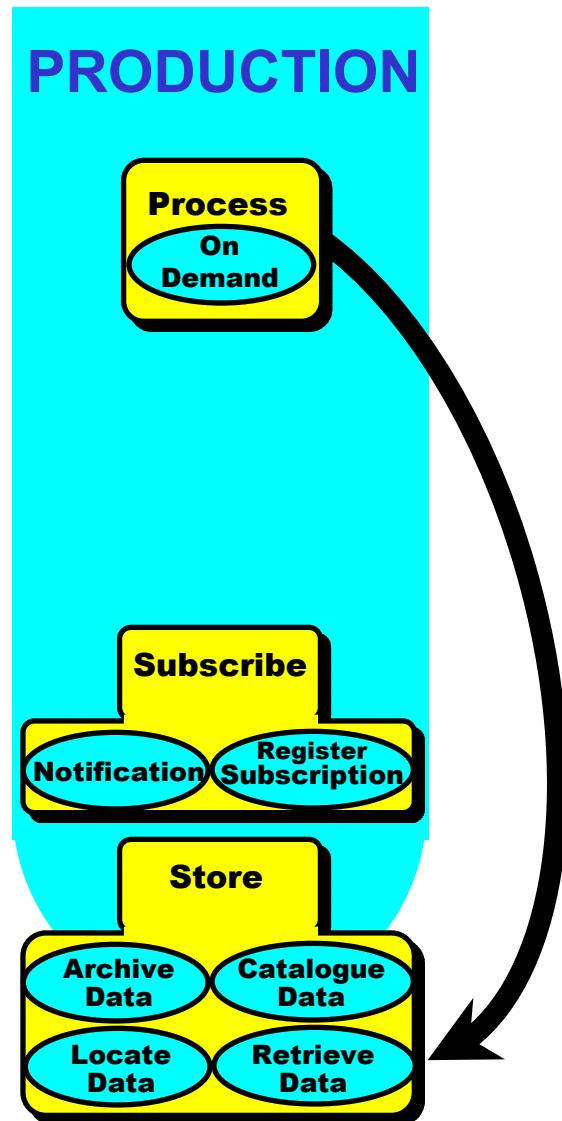
# ASTER: CSCI/Component Role in Input Data Location



# Chaining and On-Demand Production (Cont.)



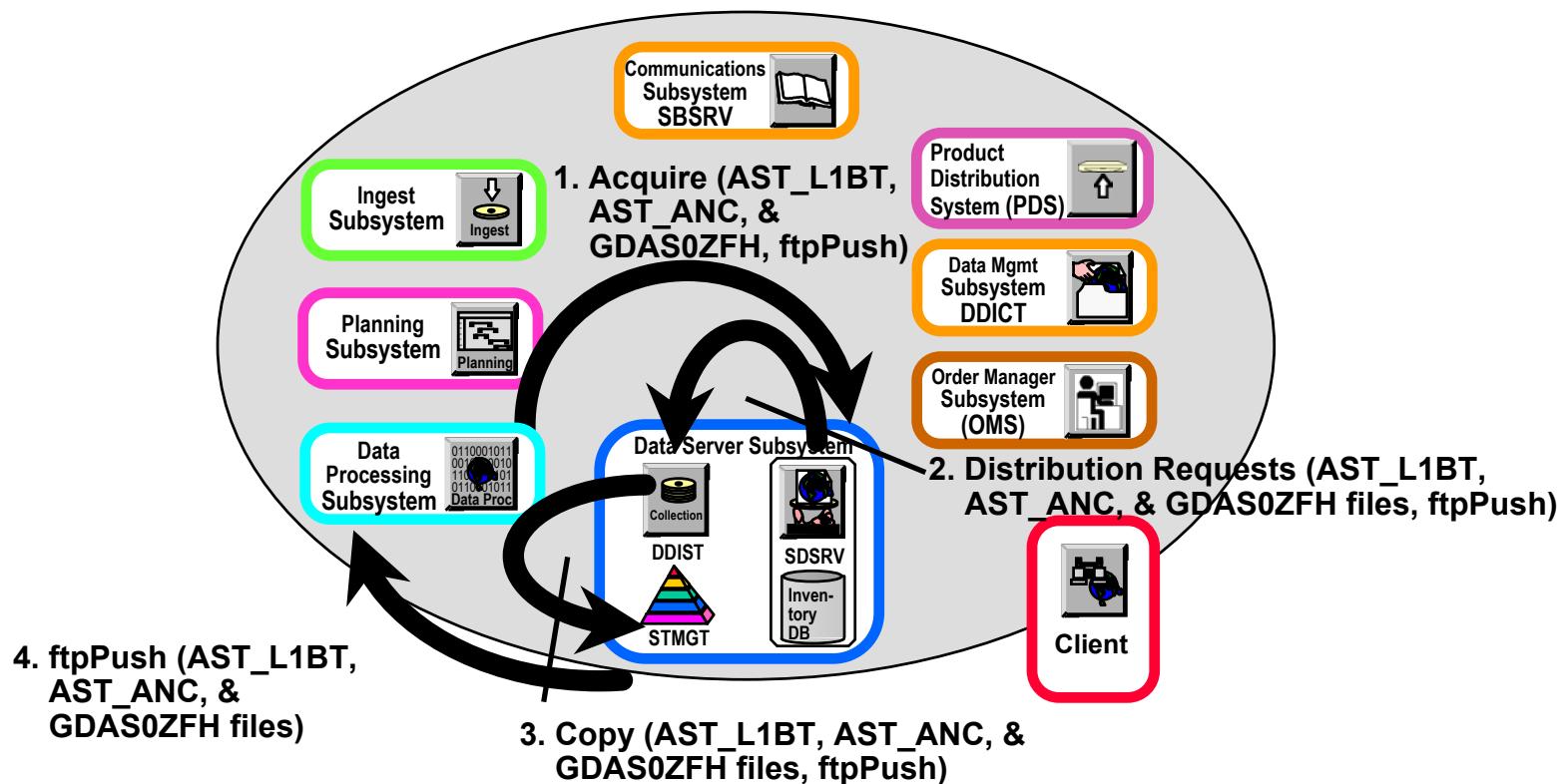
Retrieve  
AST\_L1B,  
AST\_ANC  
(ASTER ancillary  
data set), and  
GDAS0ZFH  
granules as input  
to ACT; PGE  
execution begins



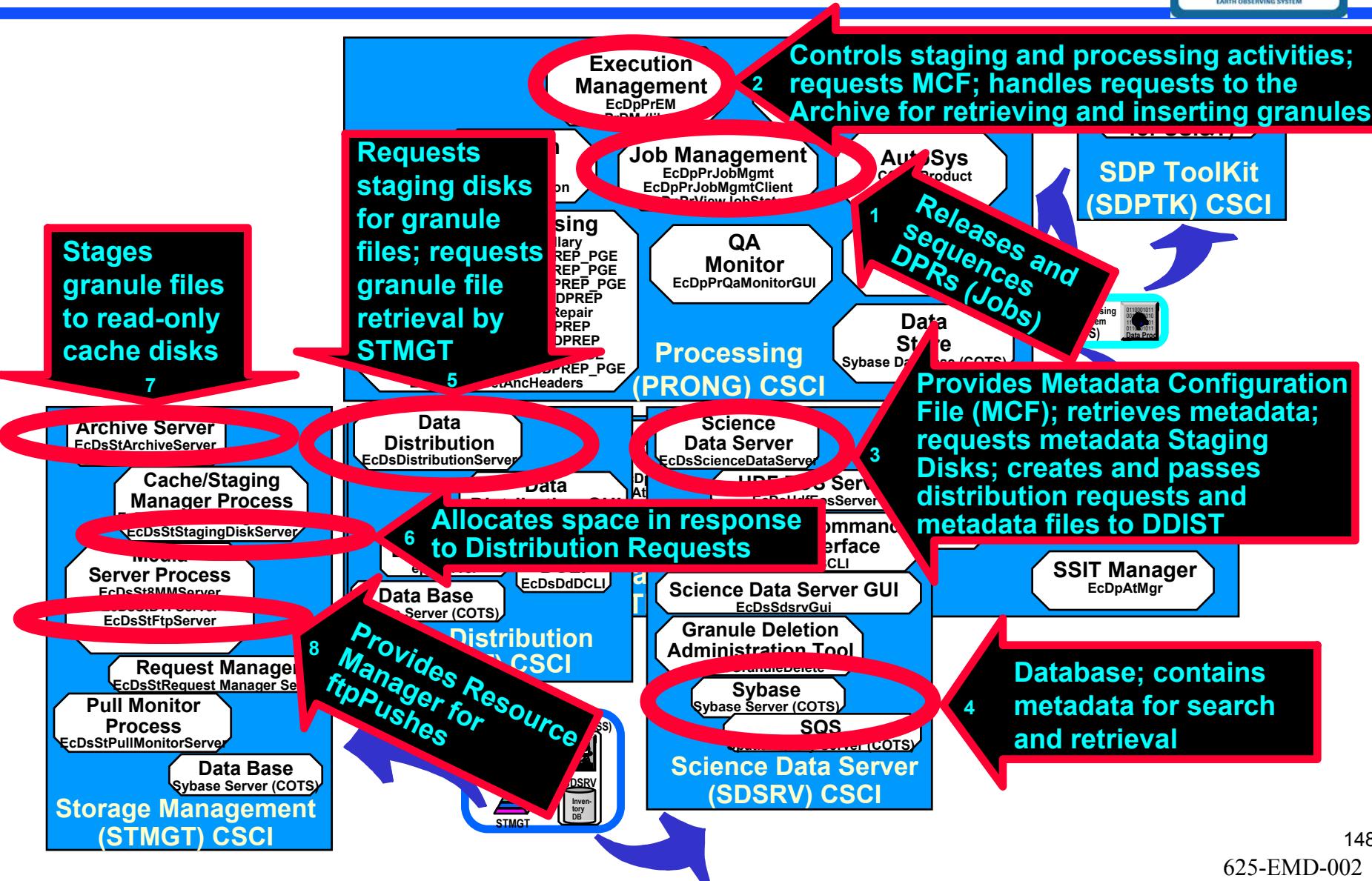
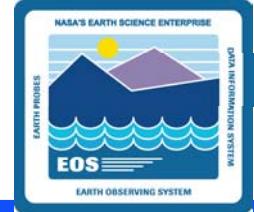


# ASTER: Job Staging Process

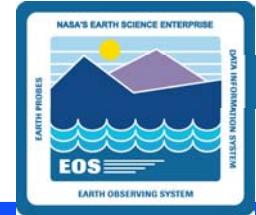
ACT production job retrieves required AST\_L1BT (L1B TIR), AST\_ANC (ASTER ancillary data set), and GDAS0ZFH (NCEP ancillary) input data granules.



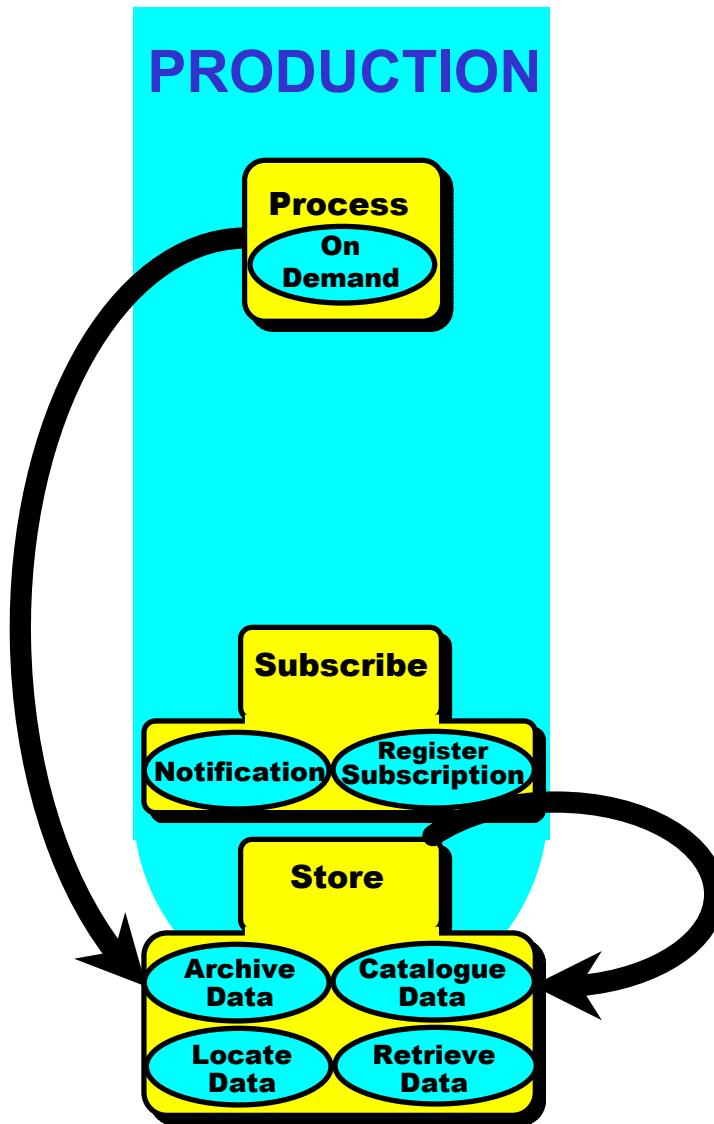
# ASTER: CSCI/Component Role in Job Staging



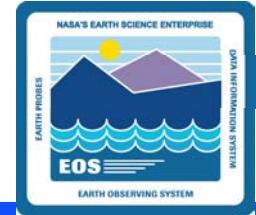
# Chaining and On-Demand Production (Cont.)



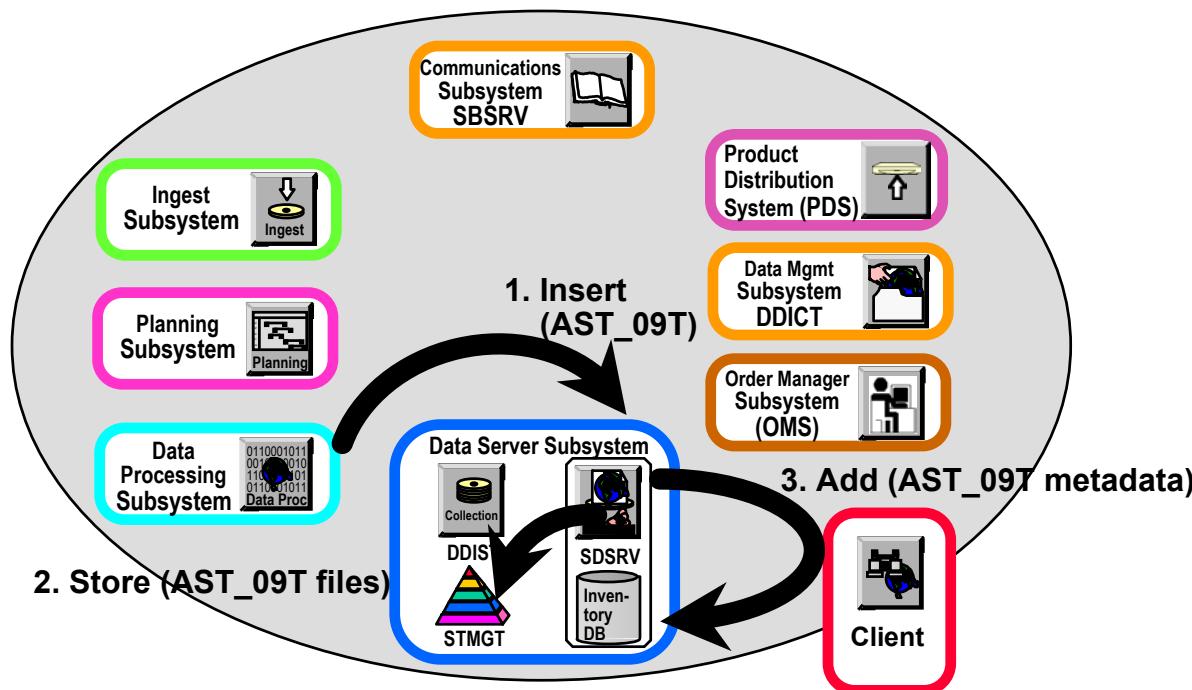
Archive newly created AST\_09T (L2 Surface Radiance TIR) granule after completion of ACT PGE; update catalogue with reference to AST\_09T



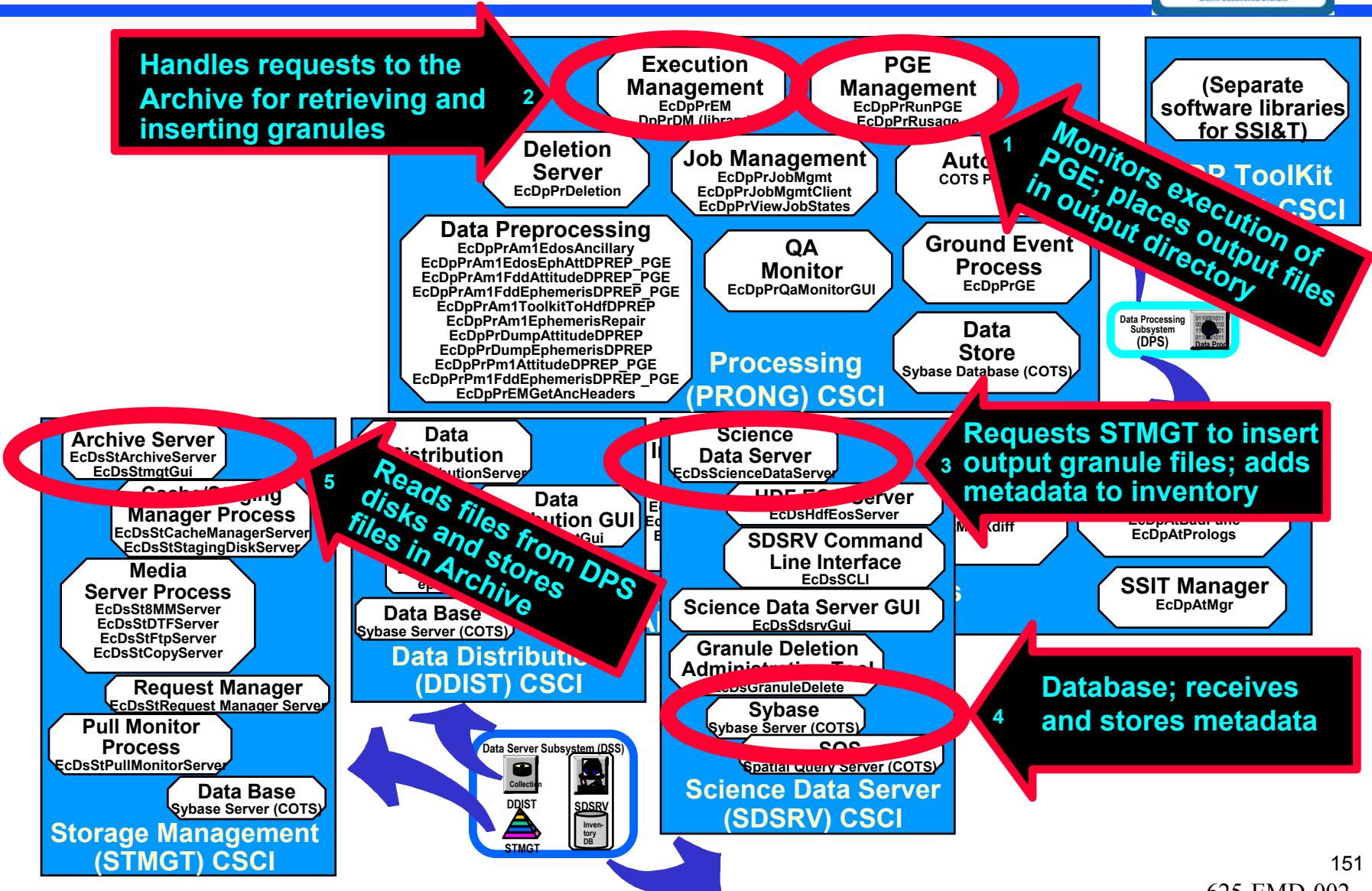
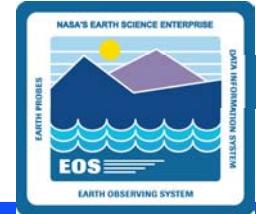
# ASTER: PGE Execution and Output Insertion Process



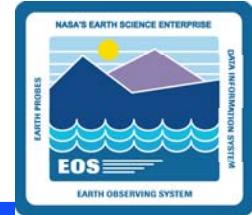
ACT PGE is successfully executed and newly created AST\_09T (L2 Surface Radiance TIR) granule is archived; inventory is updated.



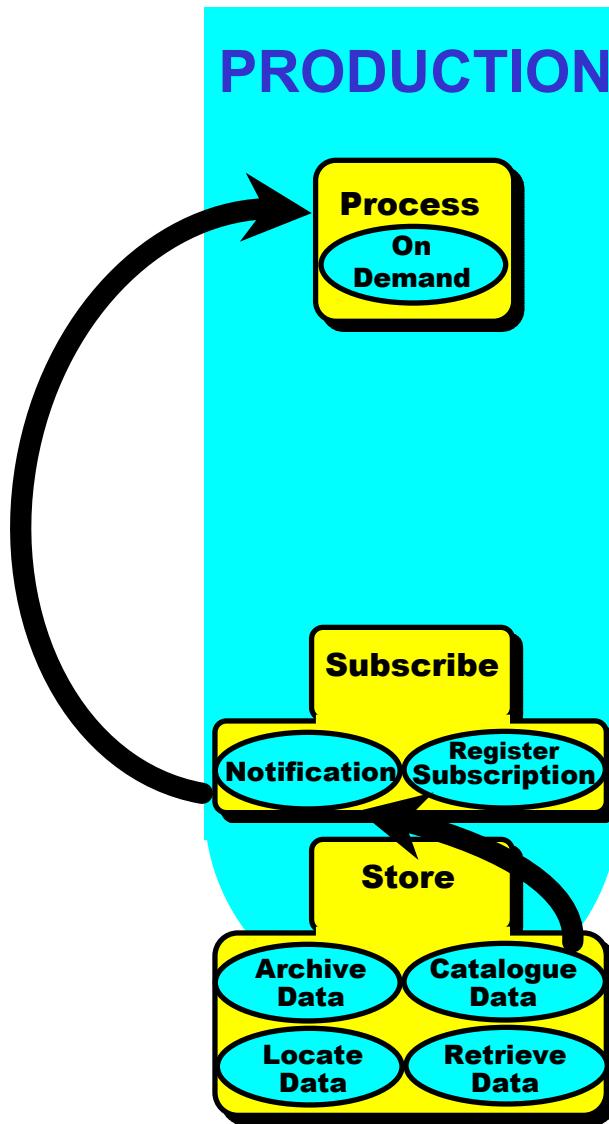
# ASTER: CSCI/Component Role in PGE Execution and Output Insertion



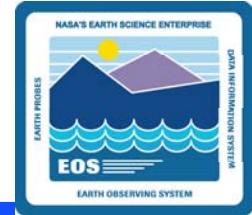
# Chaining and On-Demand Production (Cont.)



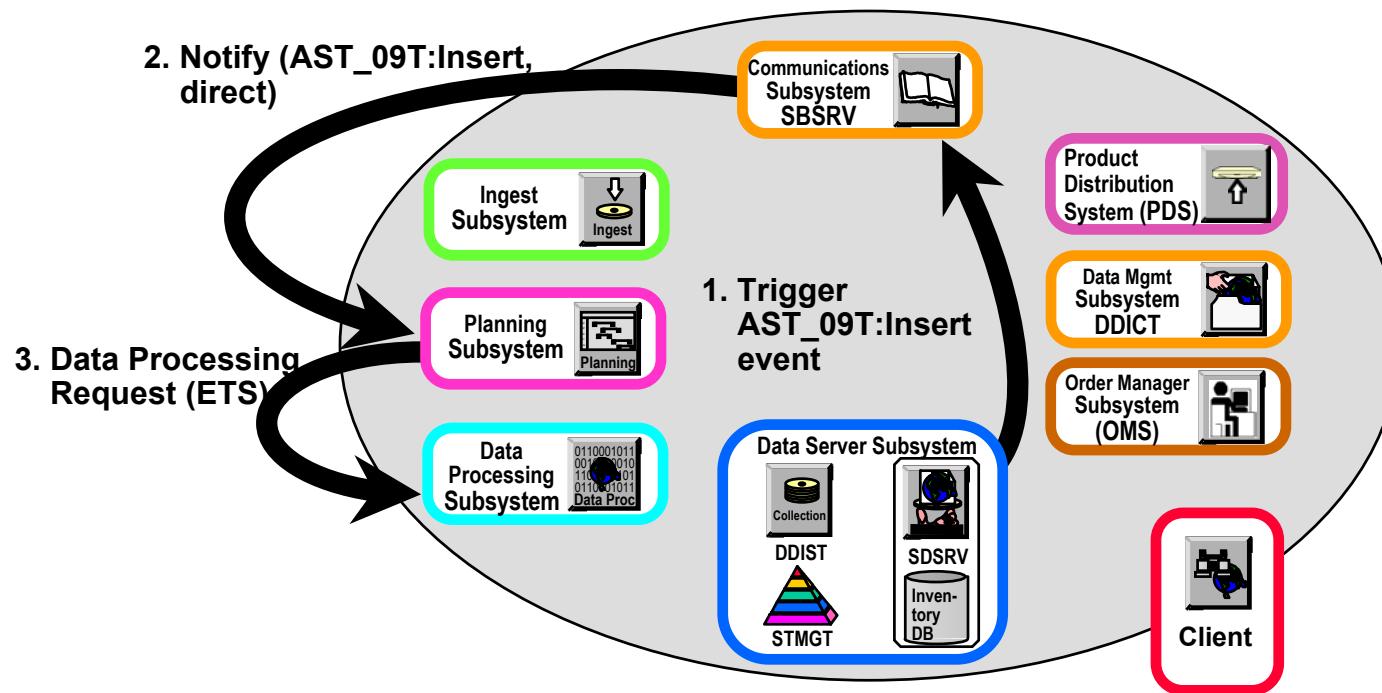
Insert terminates with an insert event notification to Subscribe, which in turn triggers initiation of ETS algorithm



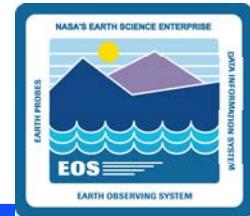
# ASTER: Notification and Subscription Triggering Process



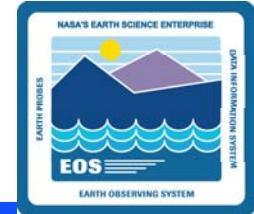
Notify all AST\_09T:Insert subscribers. This includes notification of the Planning Subsystem, for chained processing.



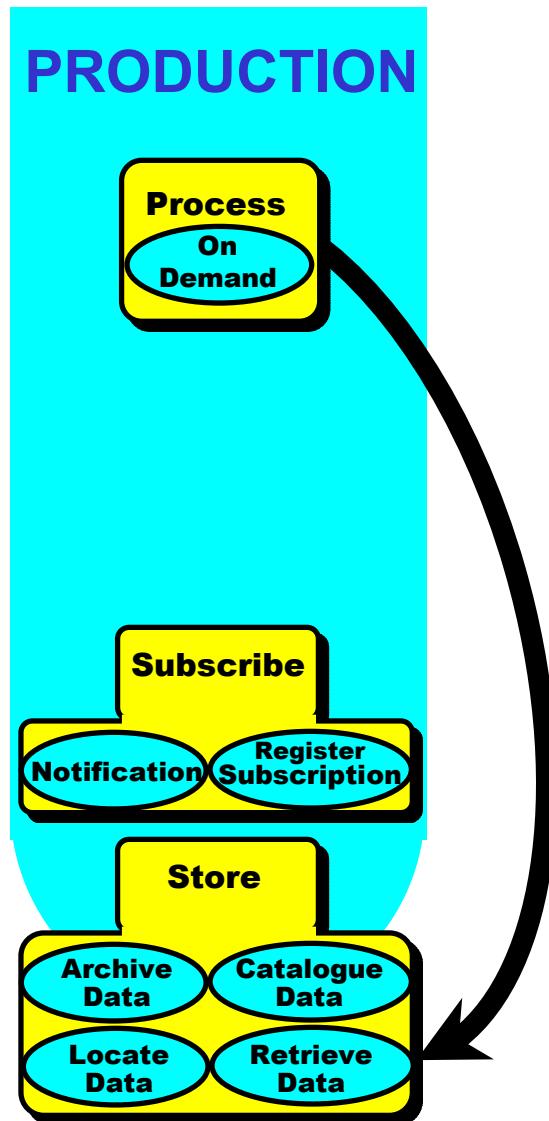
# ASTER: CSCI/Component Role in Notification/Subscription Triggering



# Chaining and On-Demand Production (Cont.)



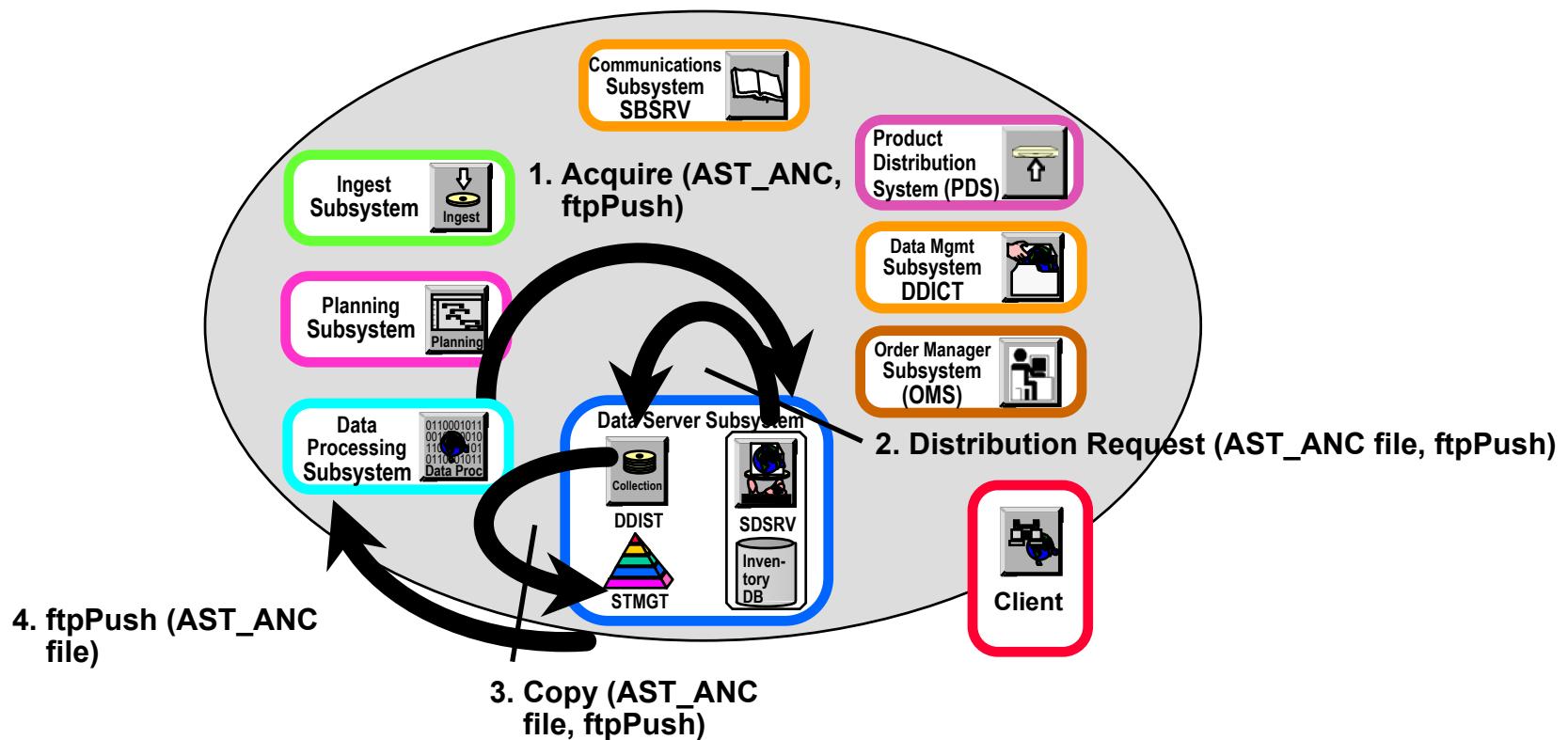
Retrieve AST\_ANC (ASTER ancillary data set) granule as input to ETS production job; PGE execution begins



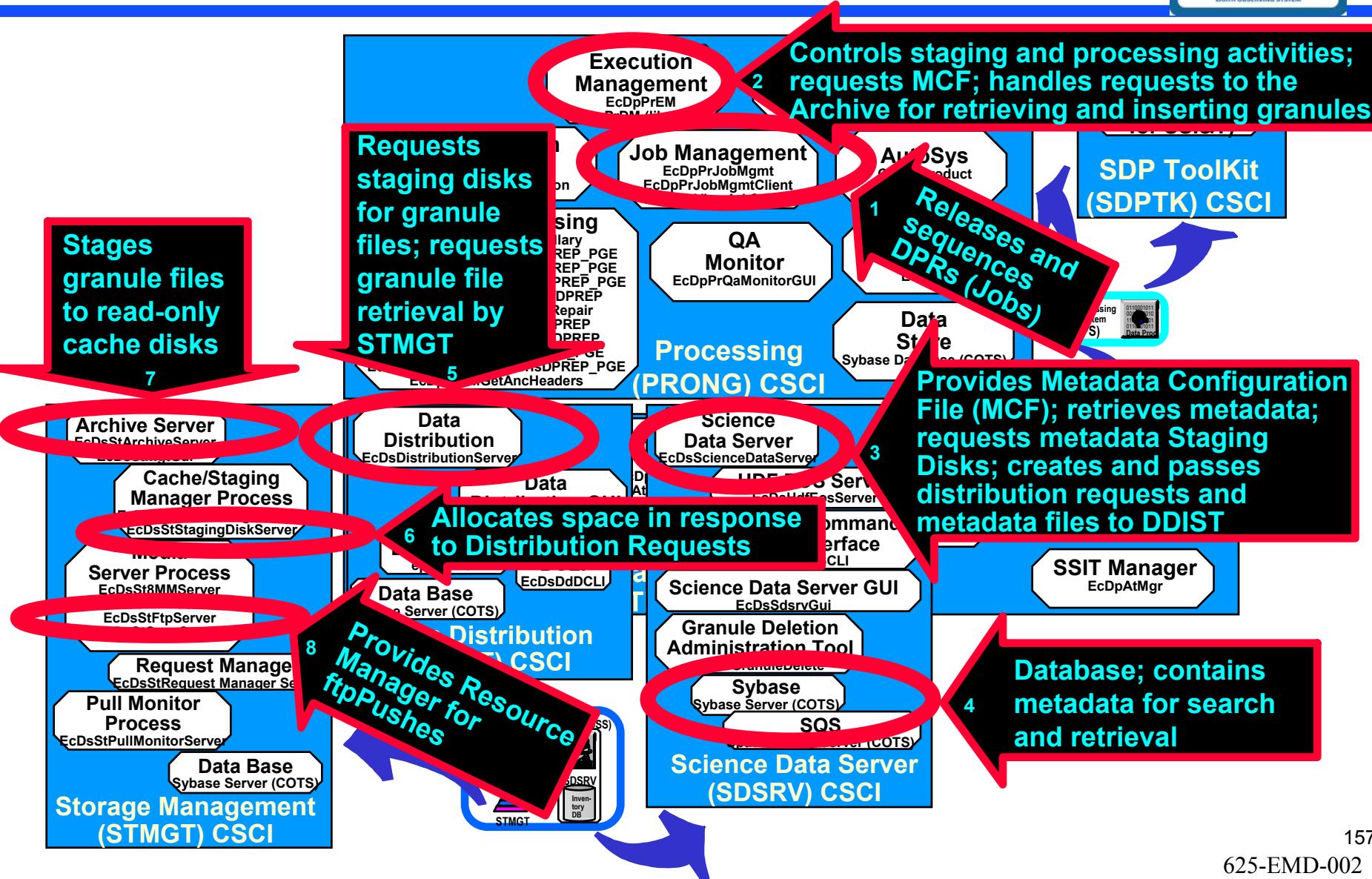


# ASTER: Job (ETS) Staging Process

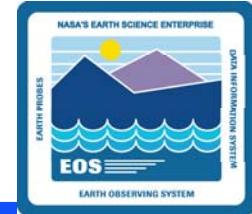
ETS production job retrieves required AST\_ANC (ASTER ancillary data set) input data granule  
(Note: AST\_09T is already available on DPS resources).



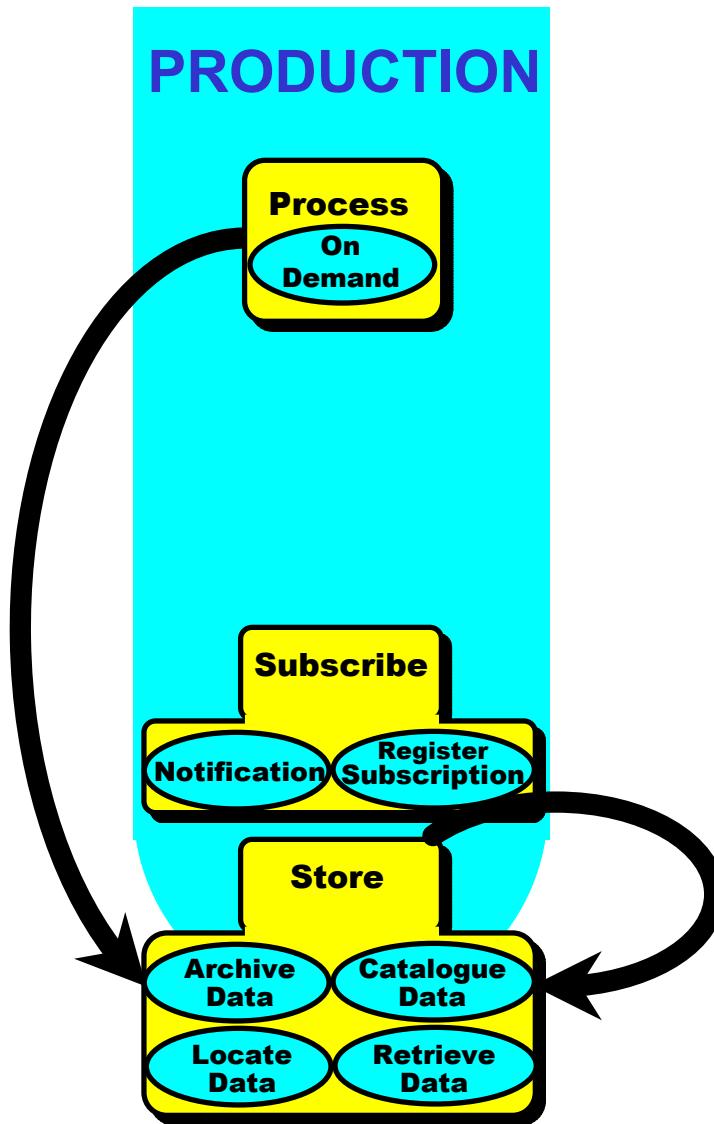
# ASTER: CSCI/Component Role in Job (ETS) Staging



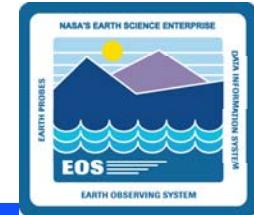
# Chaining and On-Demand Production (Cont.)



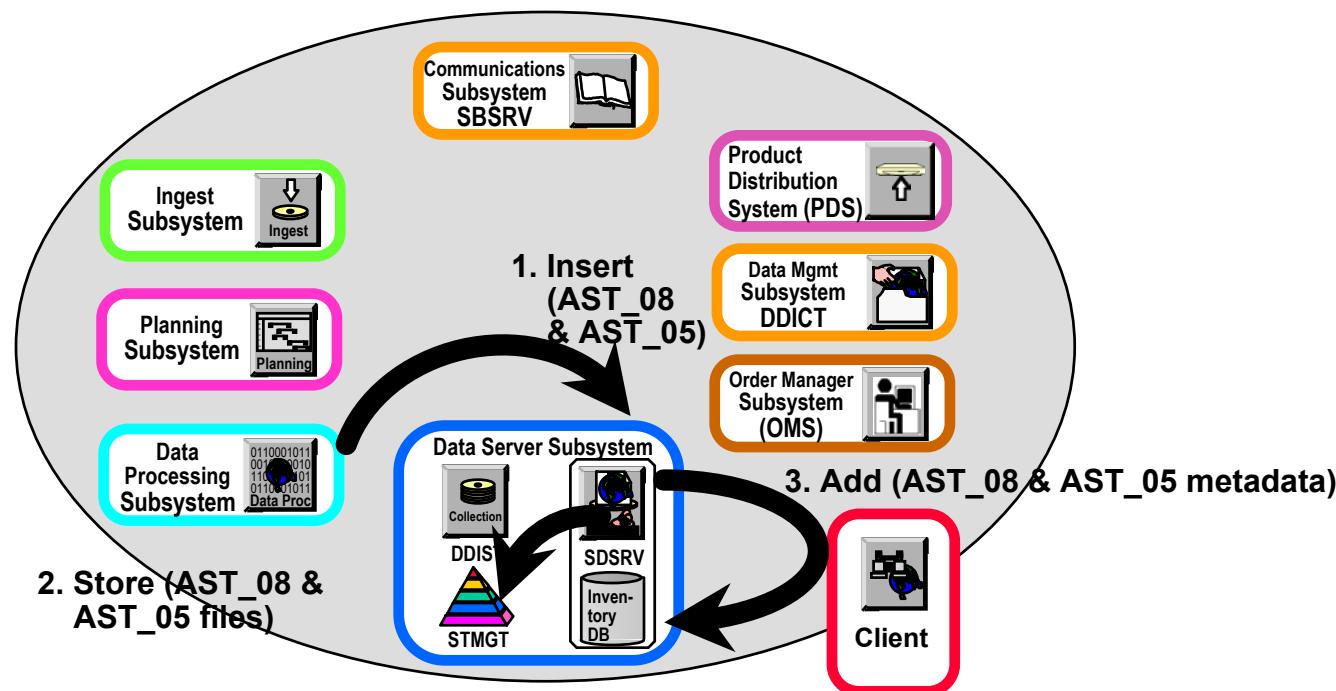
Archive newly created AST\_08 (L2 Surface Temperature) and AST\_05 (L2 Surface Emissivity) granules after completion of ETS PGE; update catalogue with references to AST\_08 and AST\_05



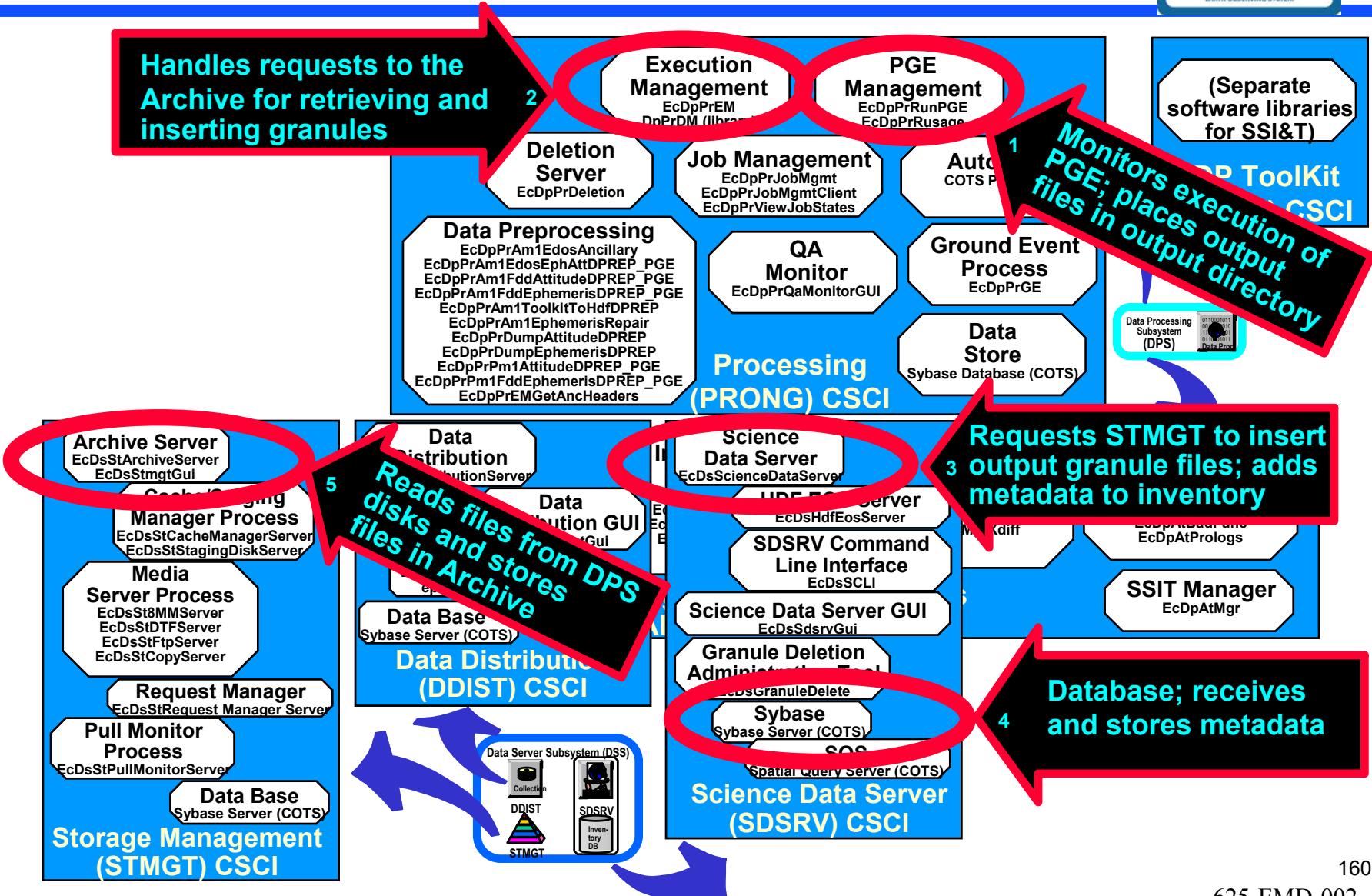
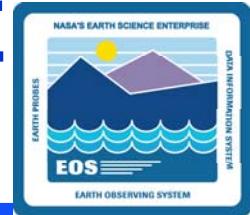
# ASTER: PGE (ETS) Execution and Output Insertion Process



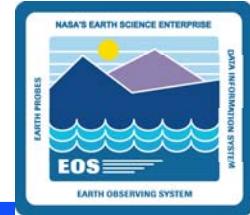
ETS PGE is successfully executed and newly created AST\_08 (L2 Surface Temperature) and AST\_05 (L2 Surface Emissivity) granules are archived; inventory is updated.



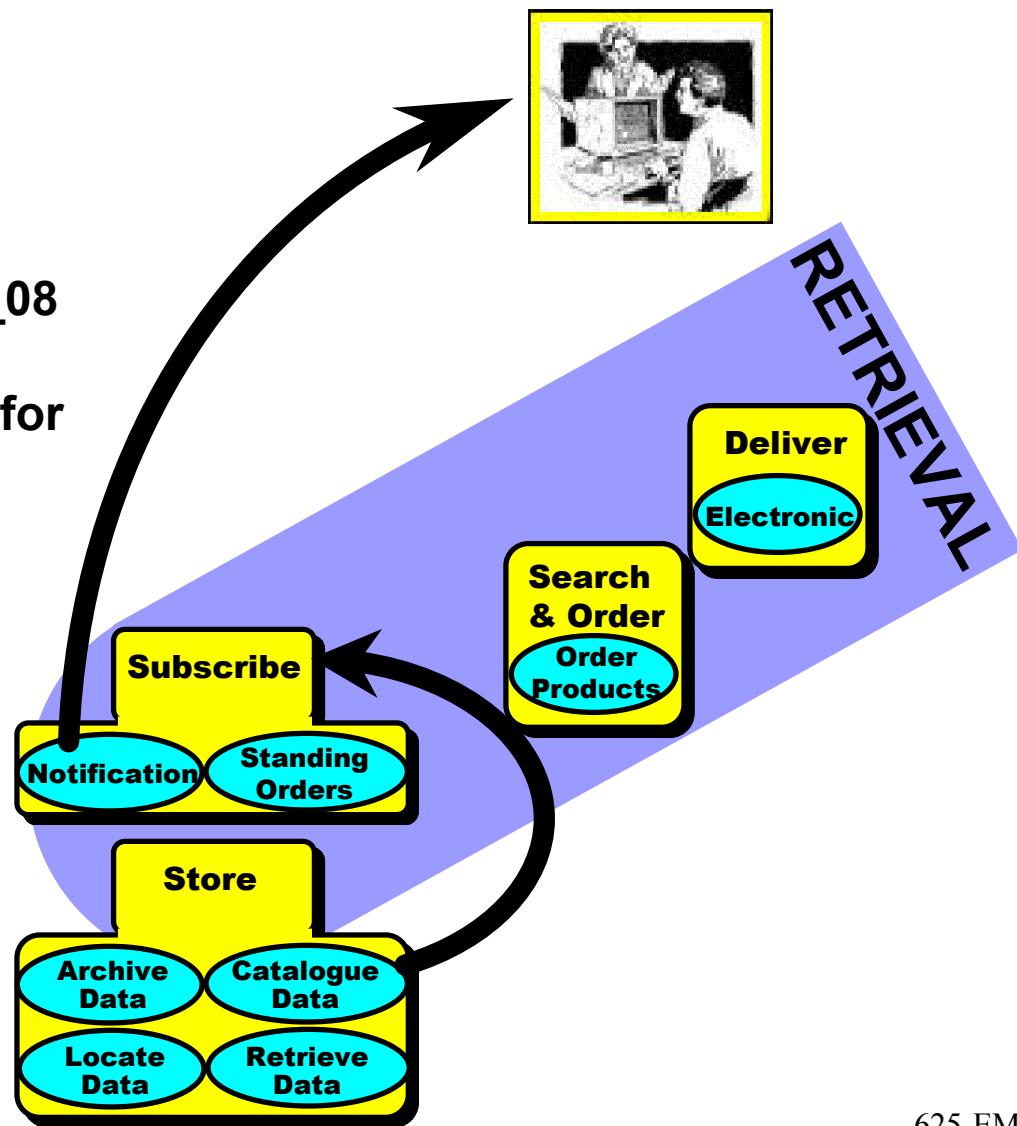
# ASTER: CSCI/Component Role in PGE (ETS) Execution and Output Insertion



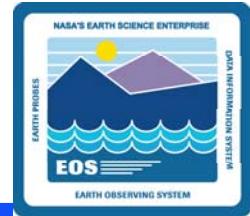
# Chaining and On-Demand Production (Cont.)



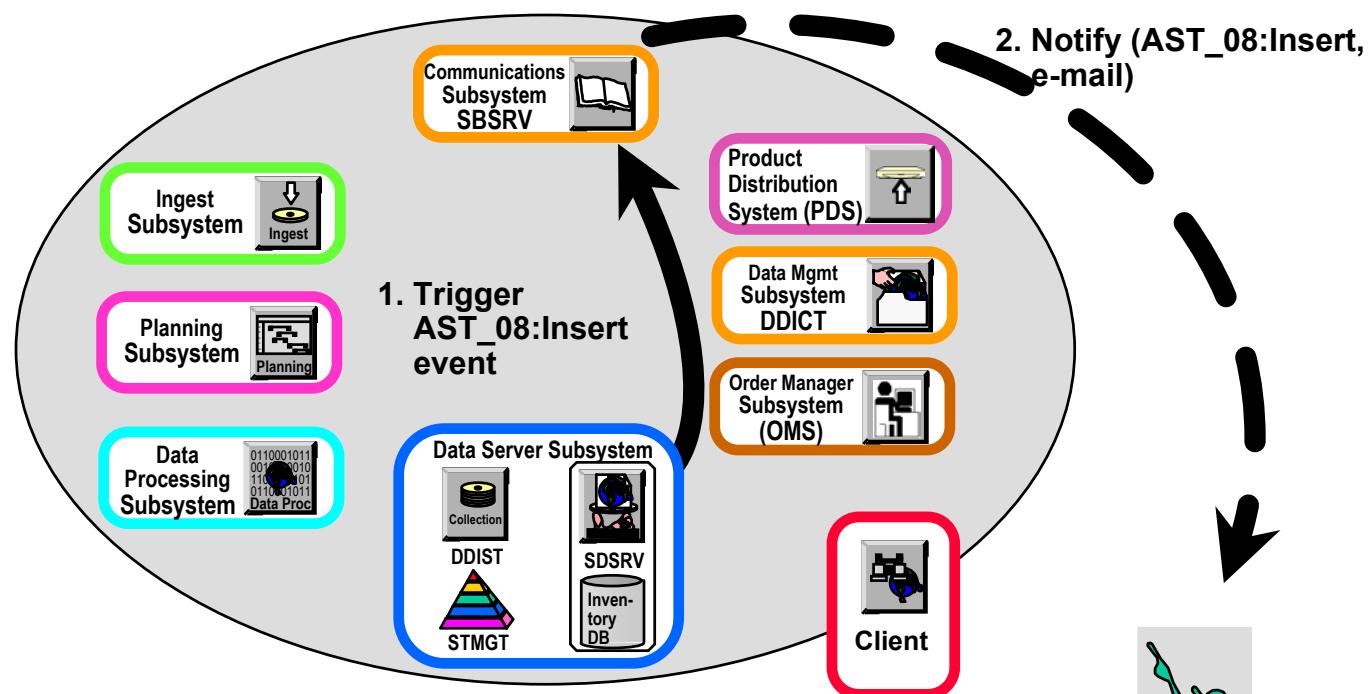
Insert terminates with an insert event notification to **Subscribe**, which triggers e-mail notification to the Science User that the AST\_08 granule has been inserted; standing order processing for new AST\_08 granule can begin



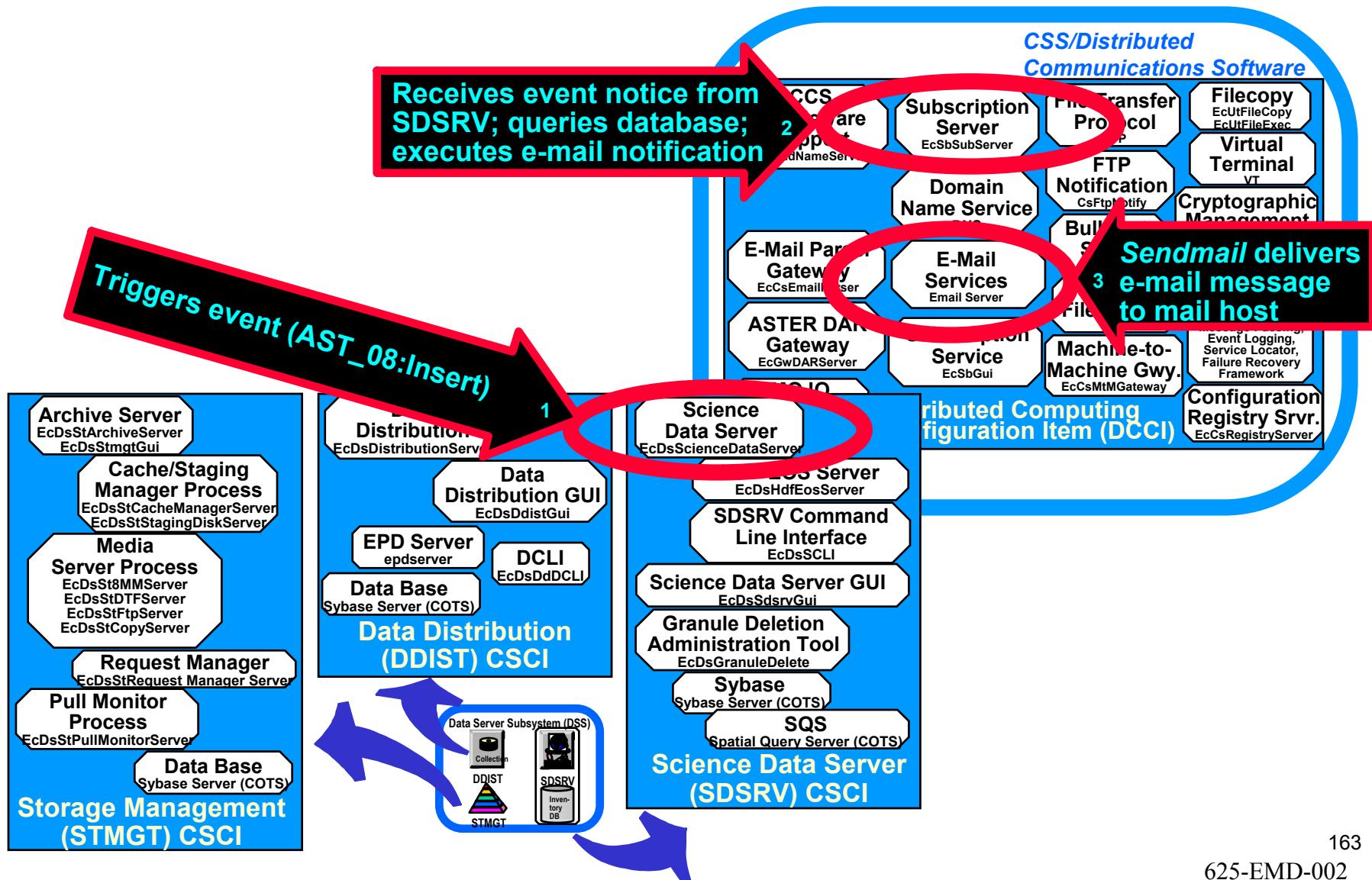
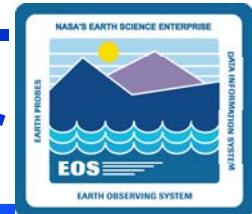
# ASTER: Notification and Subscription Triggering (AST\_08) Process



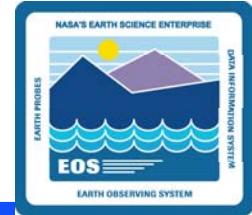
With insertion of the AST\_08 (L2 Surface Temperature) granule, the ASTER Scientist is notified by e-mail; processing can begin for the standing order



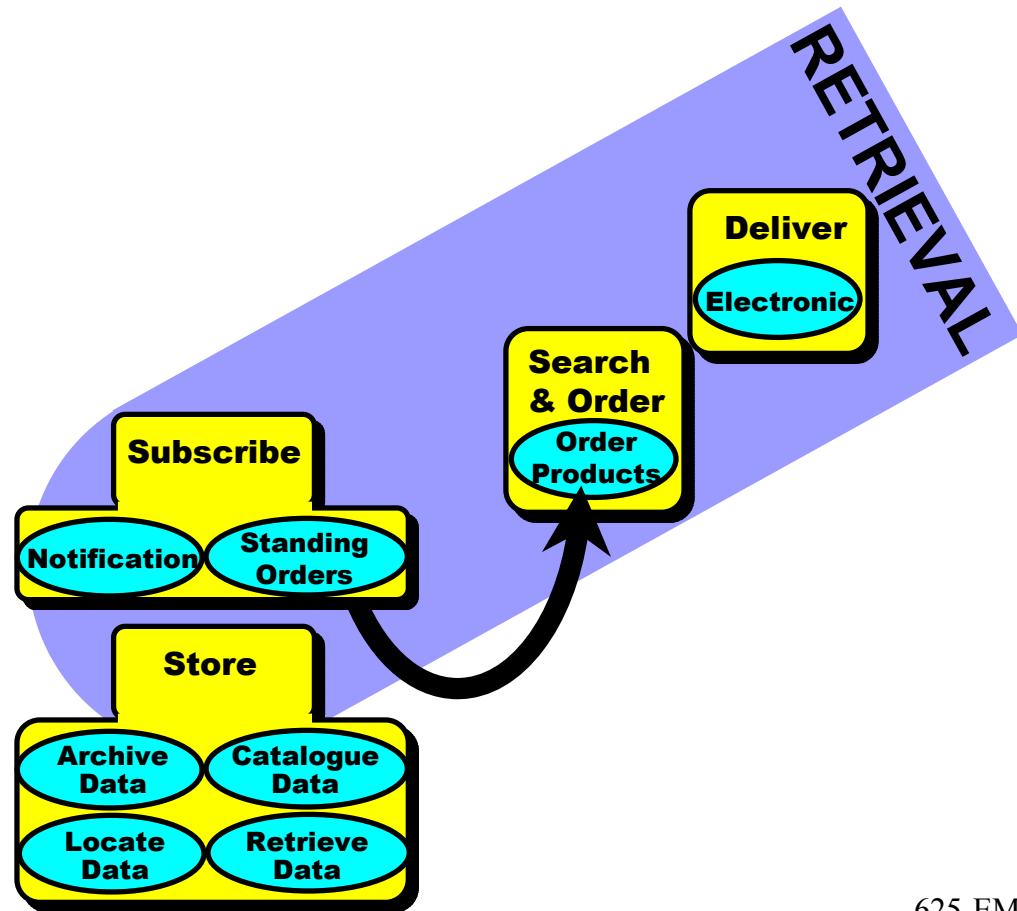
# ASTER: CSCI/Component Role in Notification/Subscription (AST\_08) Trigger



# Chaining and On-Demand Production (Cont.)



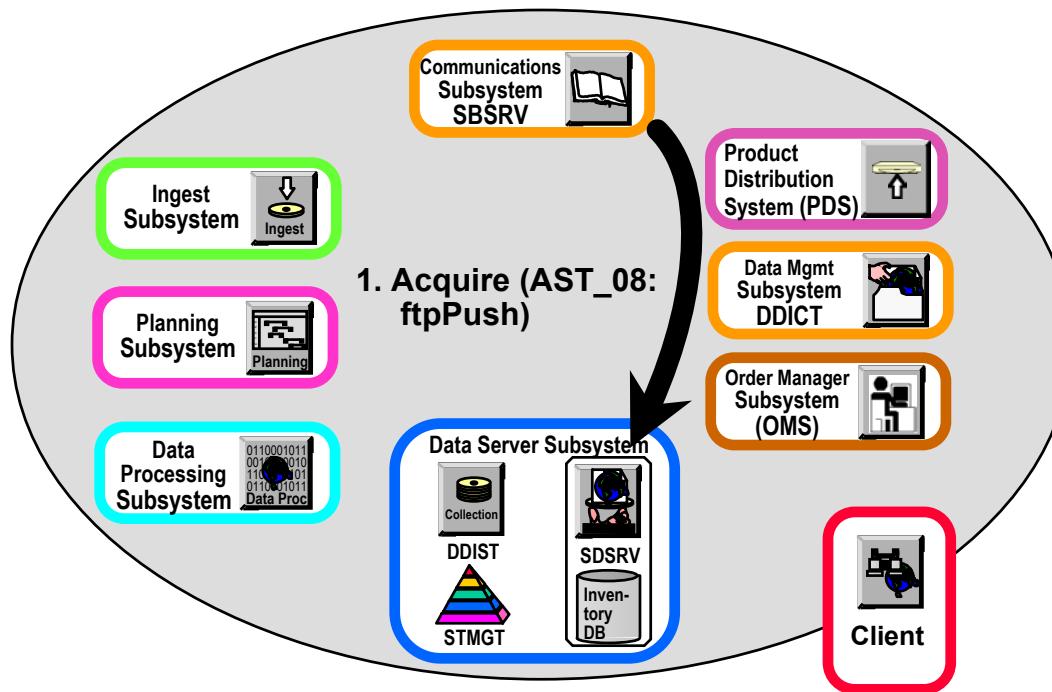
Submit acquire request for new AST\_08 granule on behalf of scientist



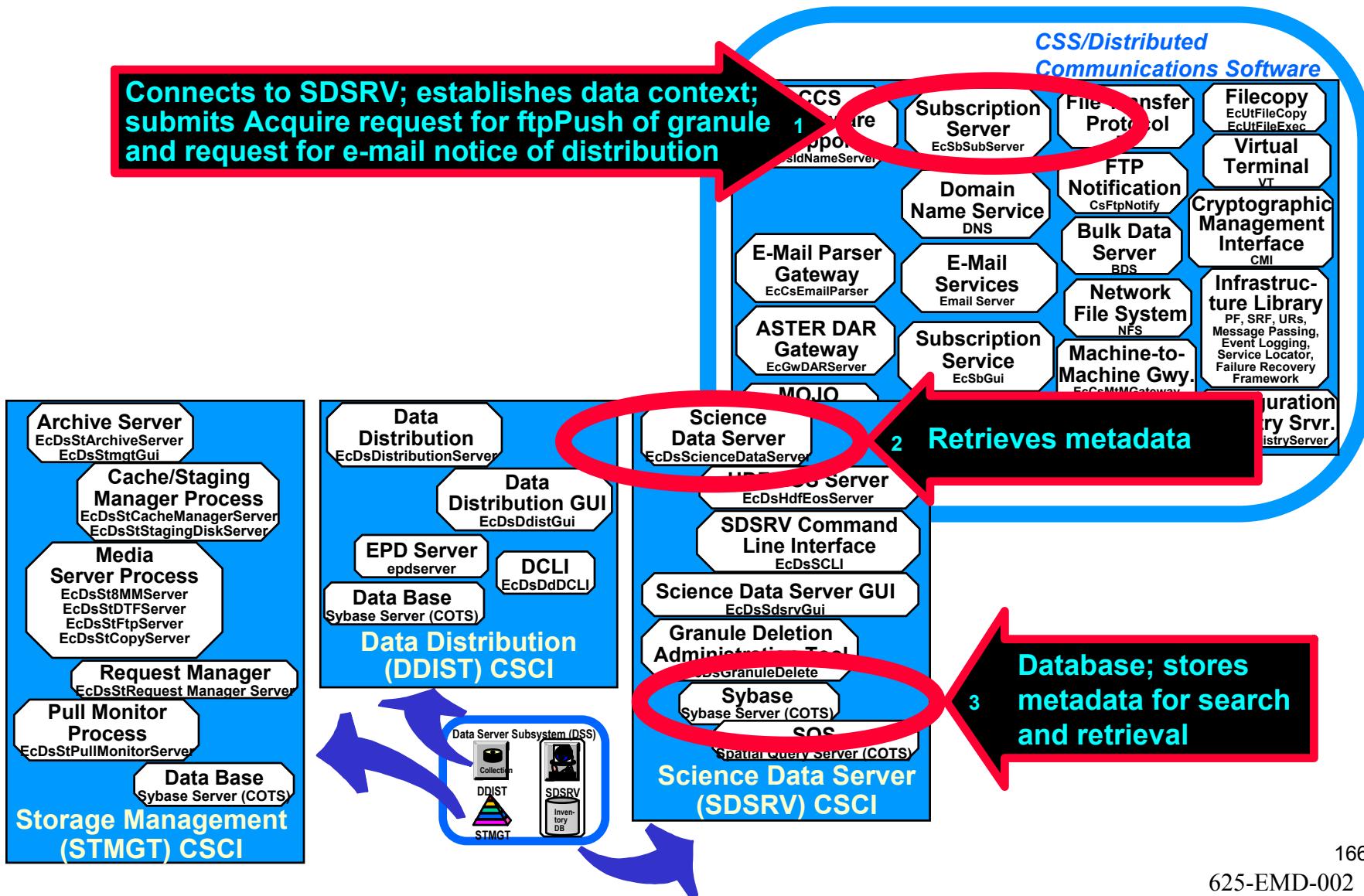
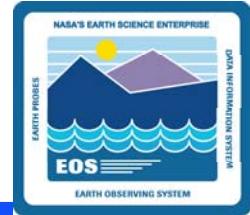
# ASTER: Standing Order, Acquire Submission Process



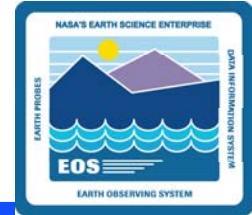
Subscription Server submits acquire request for AST\_08 (L2 Surface Temperature) data, via ftpPush, on behalf of the Science User



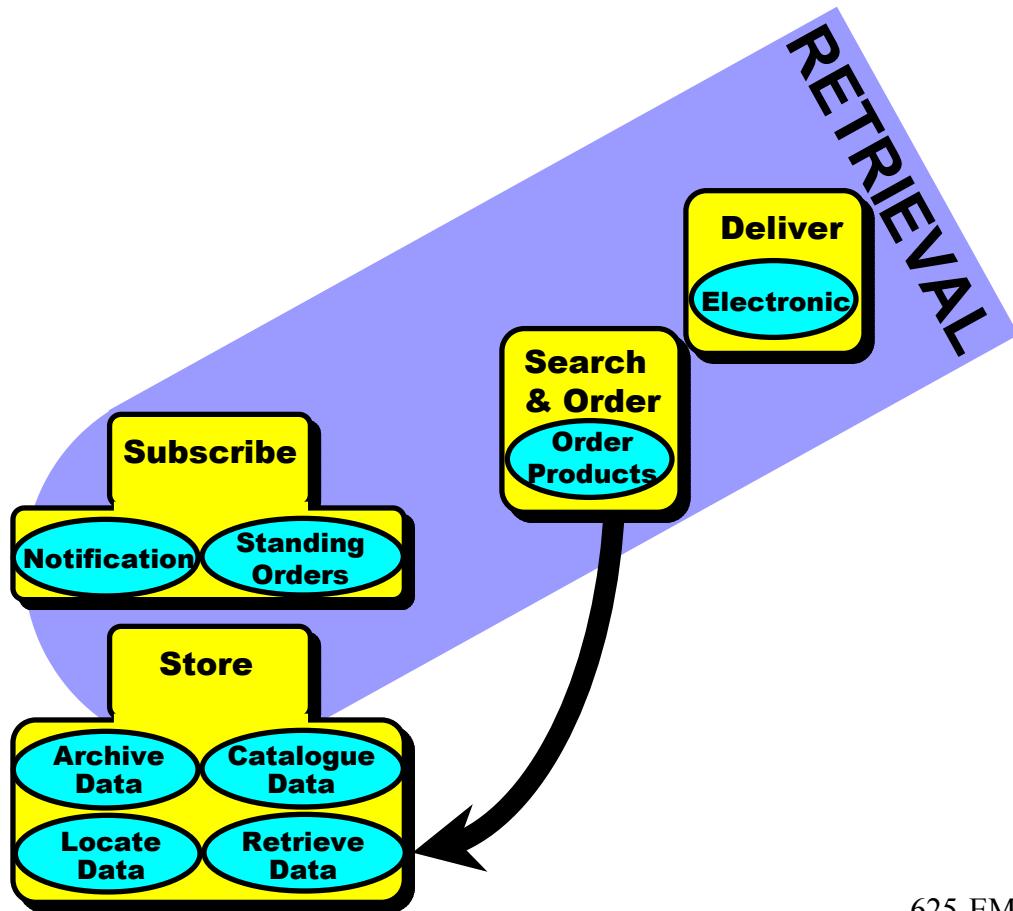
# ASTER: CSC/Component Role in Standing Order, Acquire Submission



# Chaining and On-Demand Production (Cont.)



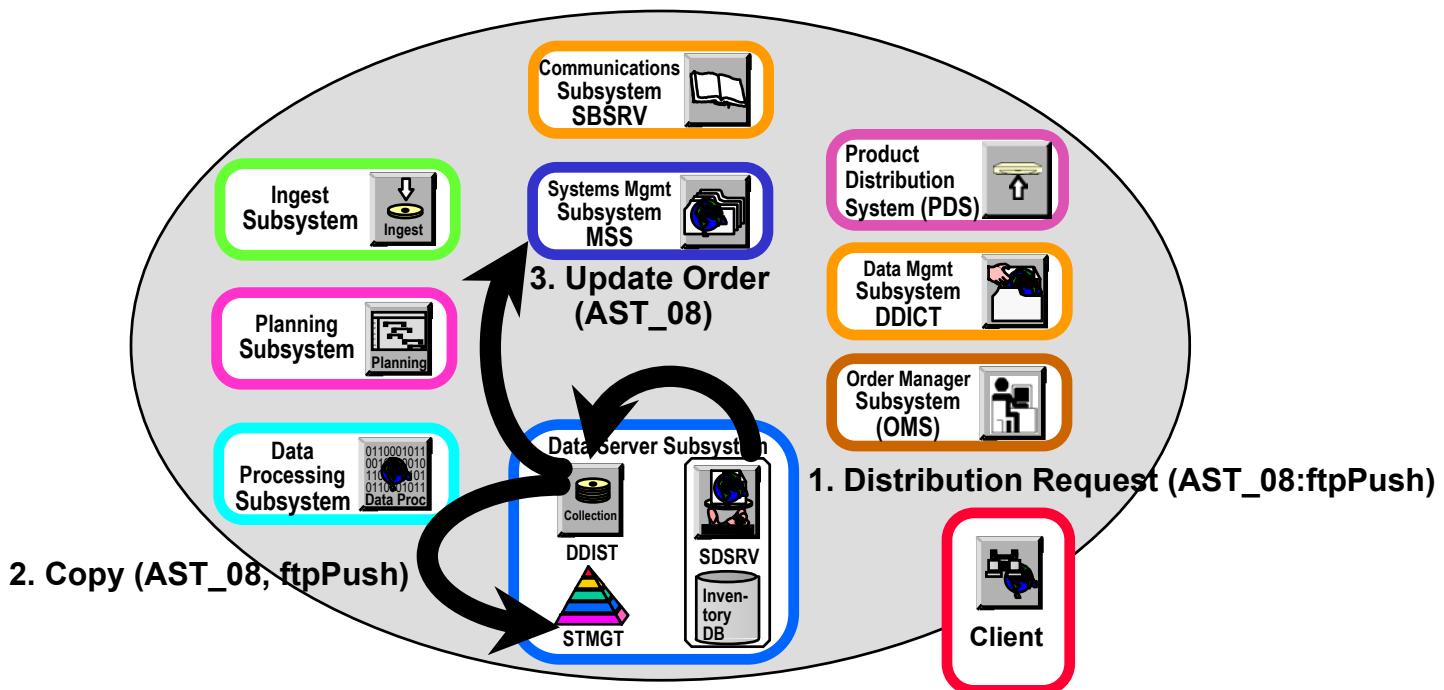
Retrieve newly created  
AST\_08 granule



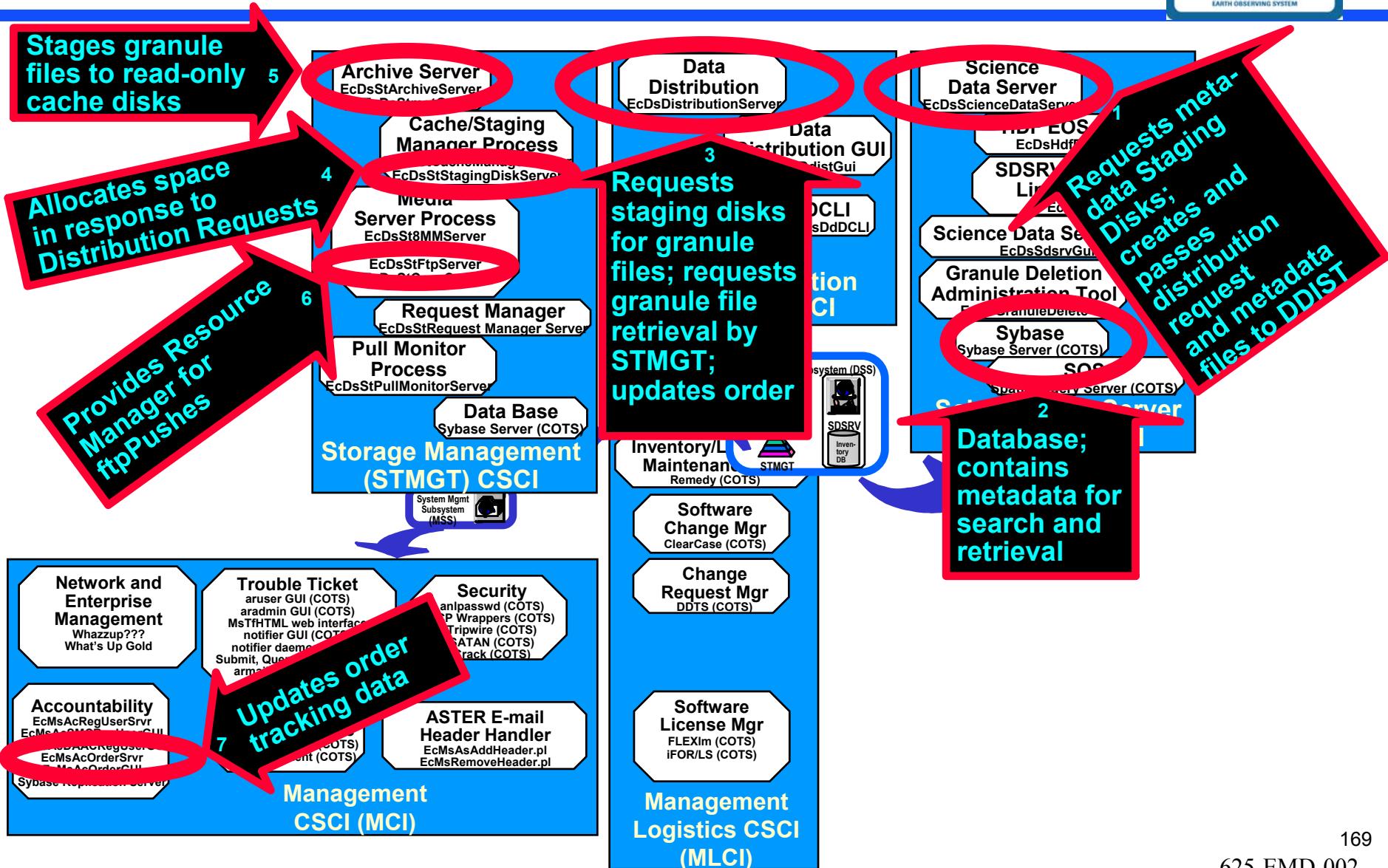
# ASTER: Retrieval of Data for Distribution Process



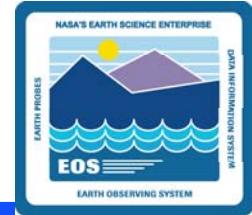
Retrieve newly created AST\_08 (L2 Surface Temperature) granule from the Archive and update the order tracking information.



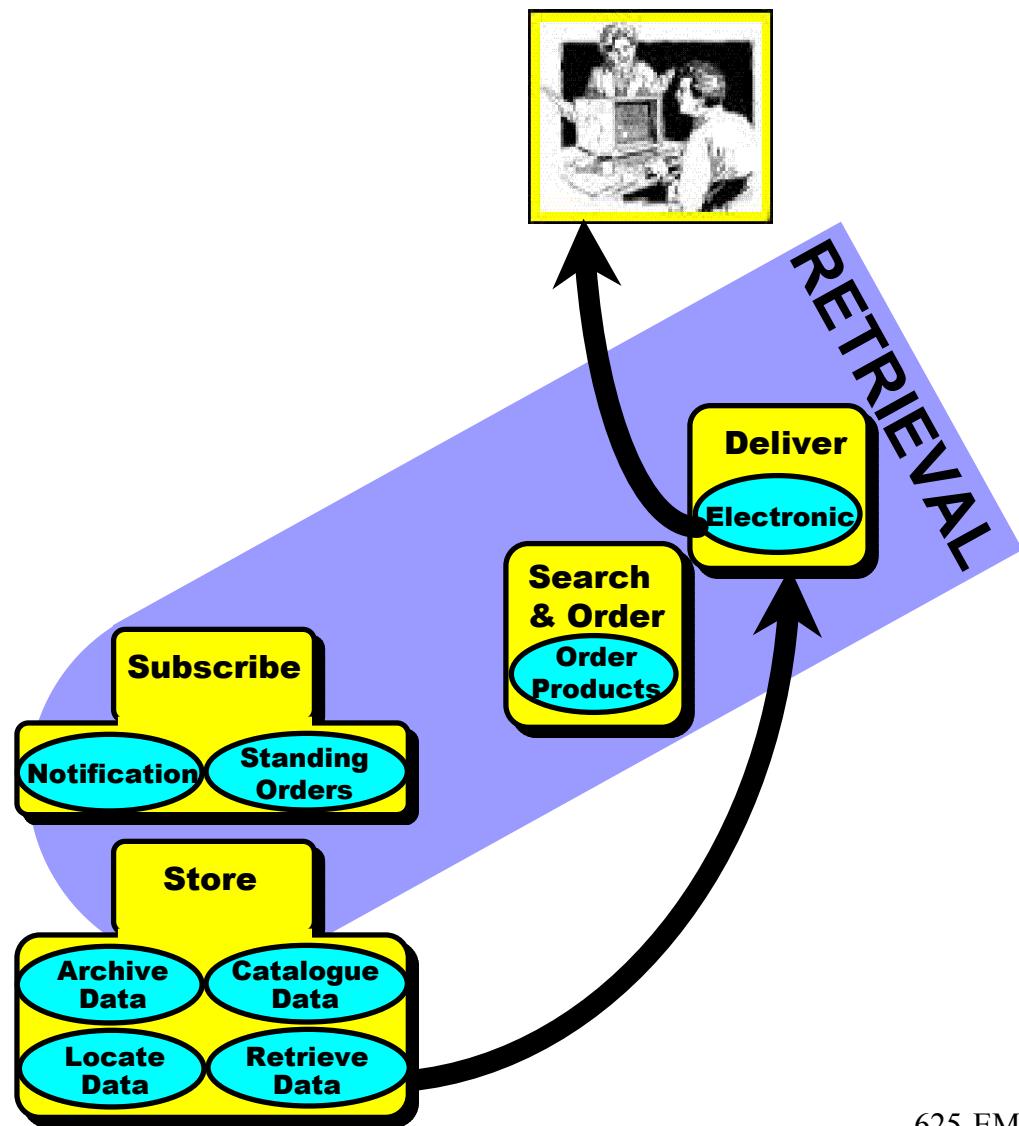
# ASTER: CSC/Component Role in Retrieval of Data for Distribution



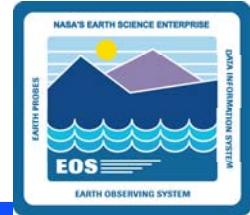
# Chaining and On-Demand Production (Cont.)



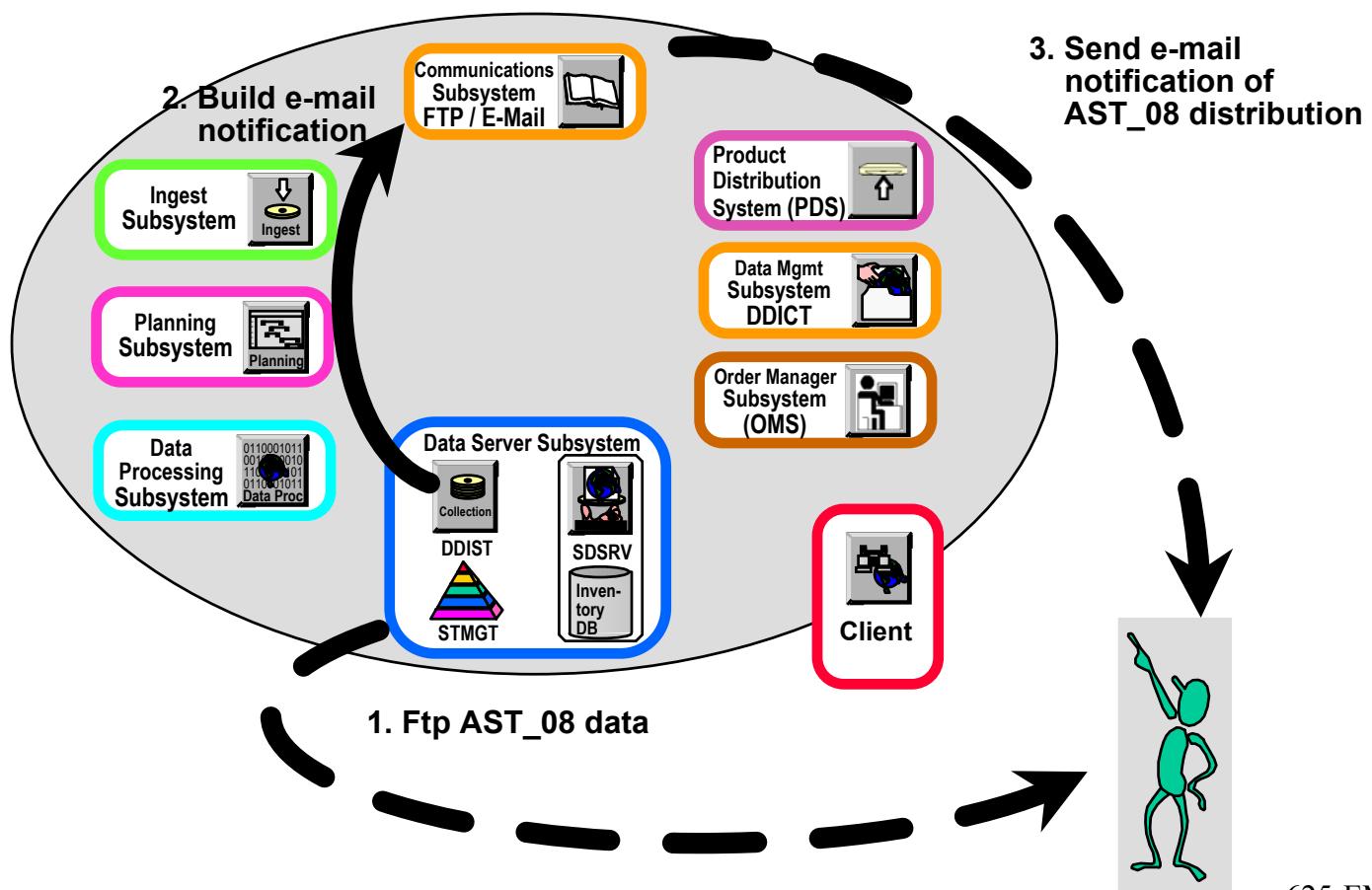
Ftp newly created AST\_08  
granule to scientist's  
workstation and send an  
e-mail notification of the  
distribution



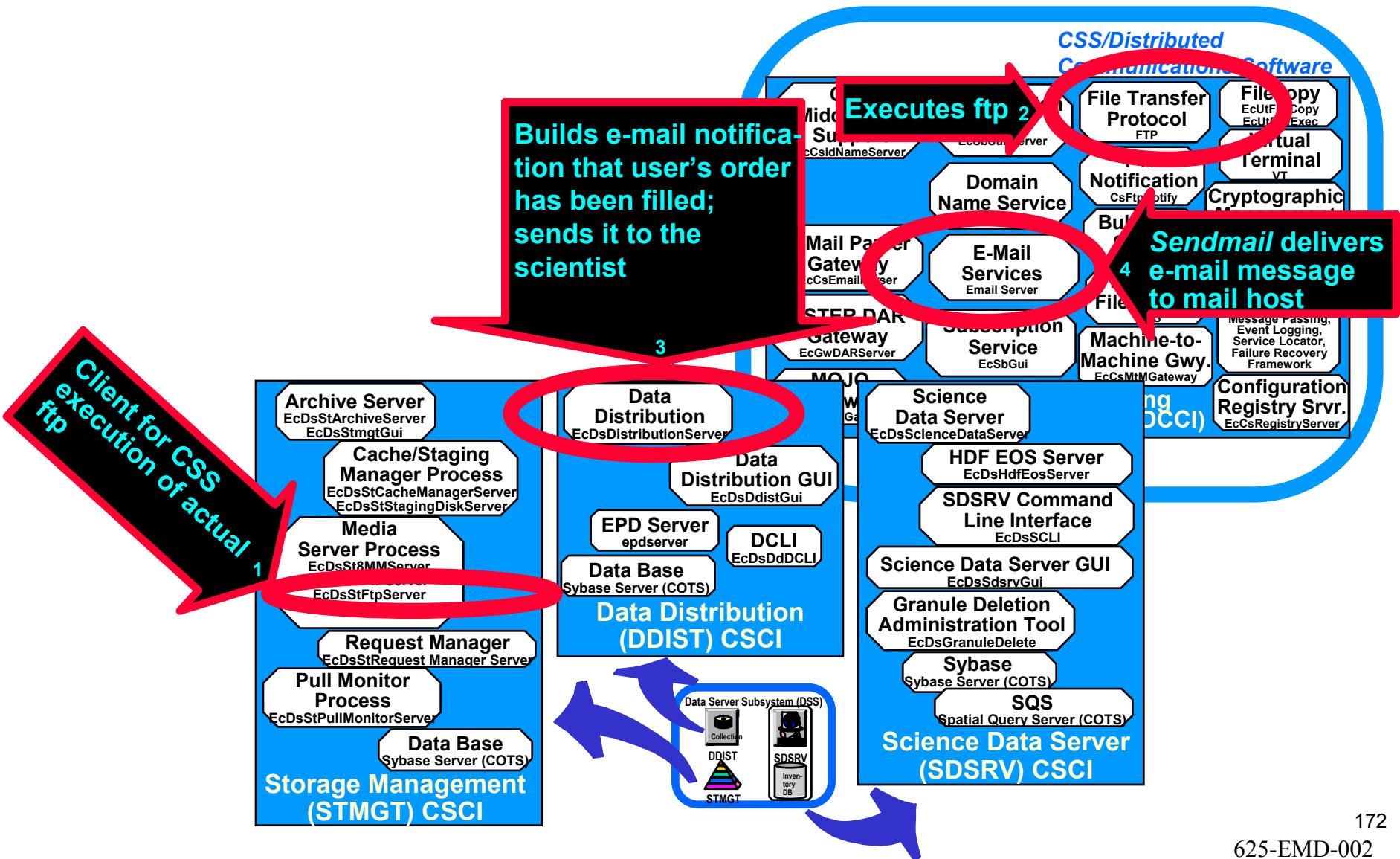
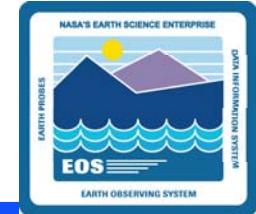
# ASTER: Electronic Data Push Distribution Process



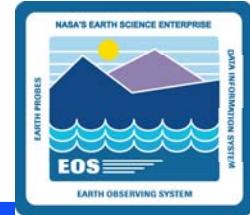
Ftp AST\_08 (L2 Surface Temperature) granule to ASTER Scientist's workstation.



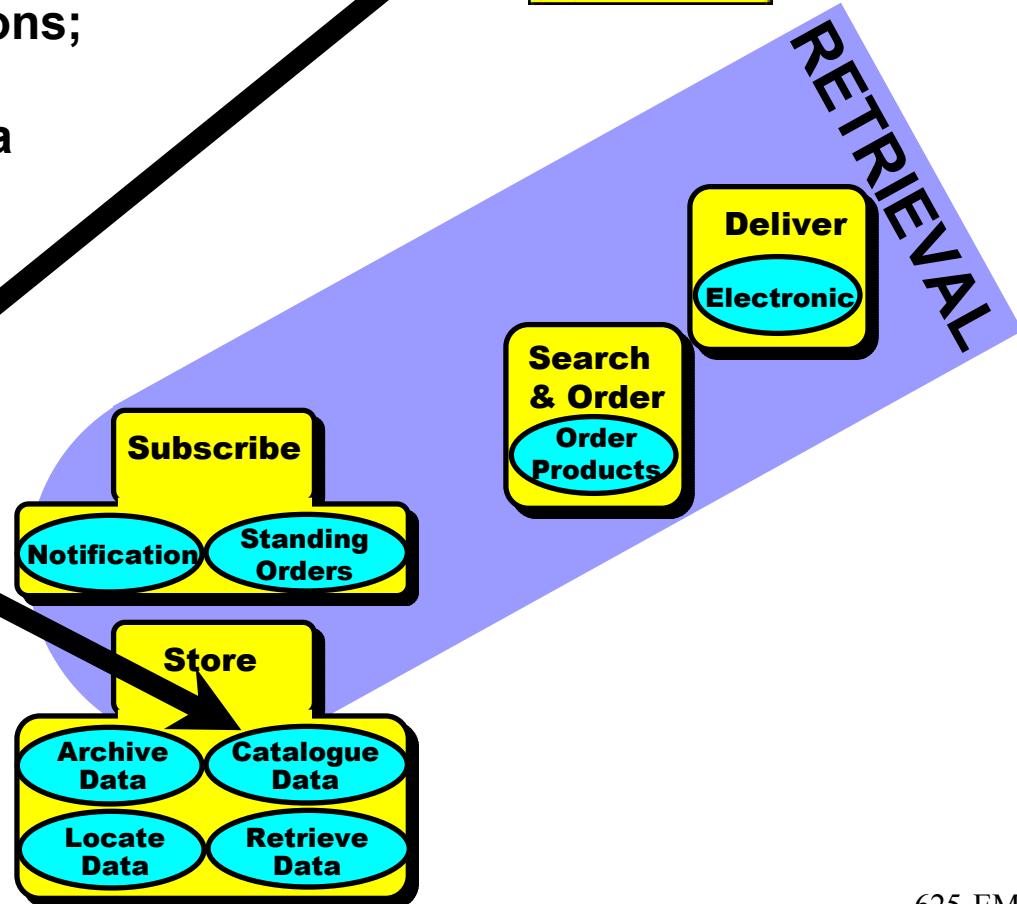
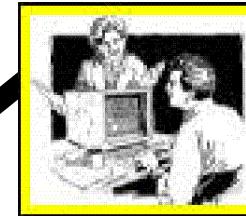
# ASTER: CSC/Component Role in Electronic Data Push Distribution



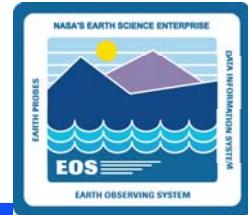
# Chaining and On-Demand Production (Cont.)



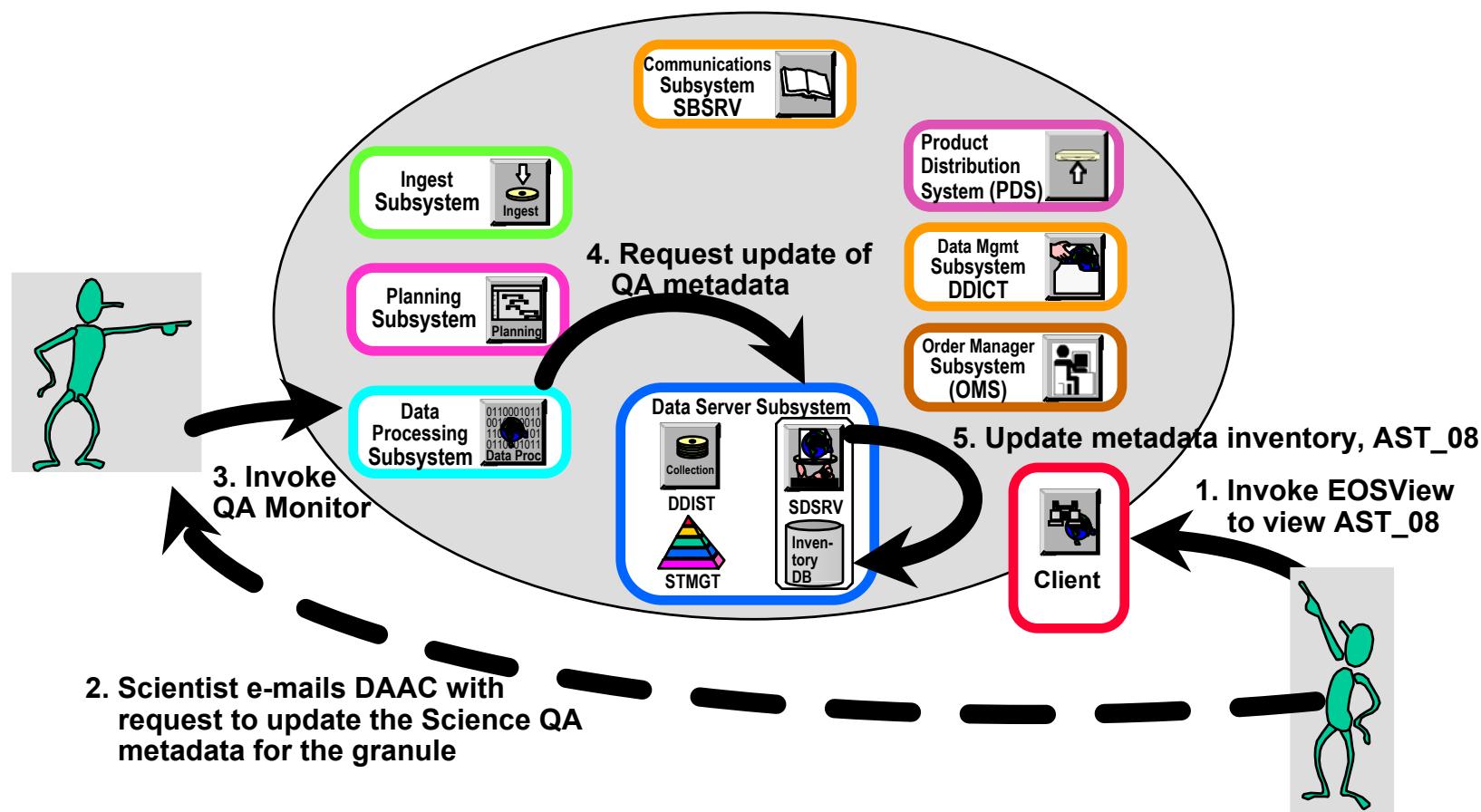
Scientist uses EOSView to perform Quality Assurance (QA) check on the AST\_08 product and e-mails DAAC Operations; DAAC Operations updates AST\_08 inventory metadata



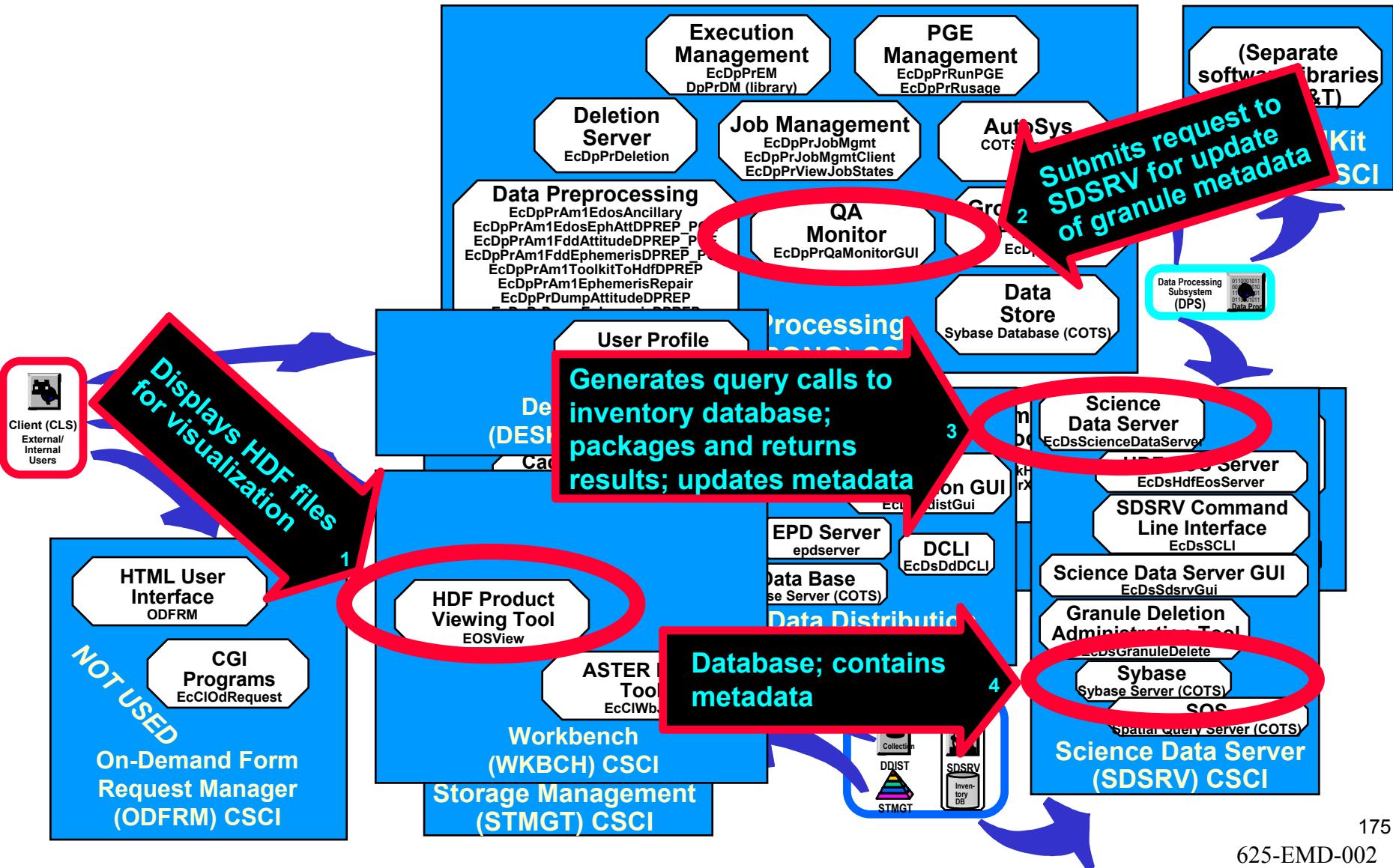
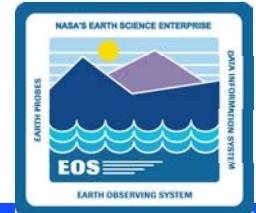
# ASTER: QA Metadata Update Process



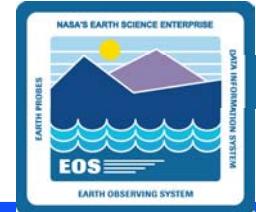
Science User uses EOSView tool to review AST\_08 (L2 Surface Temperature) product and sends e-mail request to DAAC Operations for update of the Science QA Metadata for the granule; DAAC Operations uses QA Monitor tool for the update.



# ASTER: CSC/Component Role in QA Metadata Update



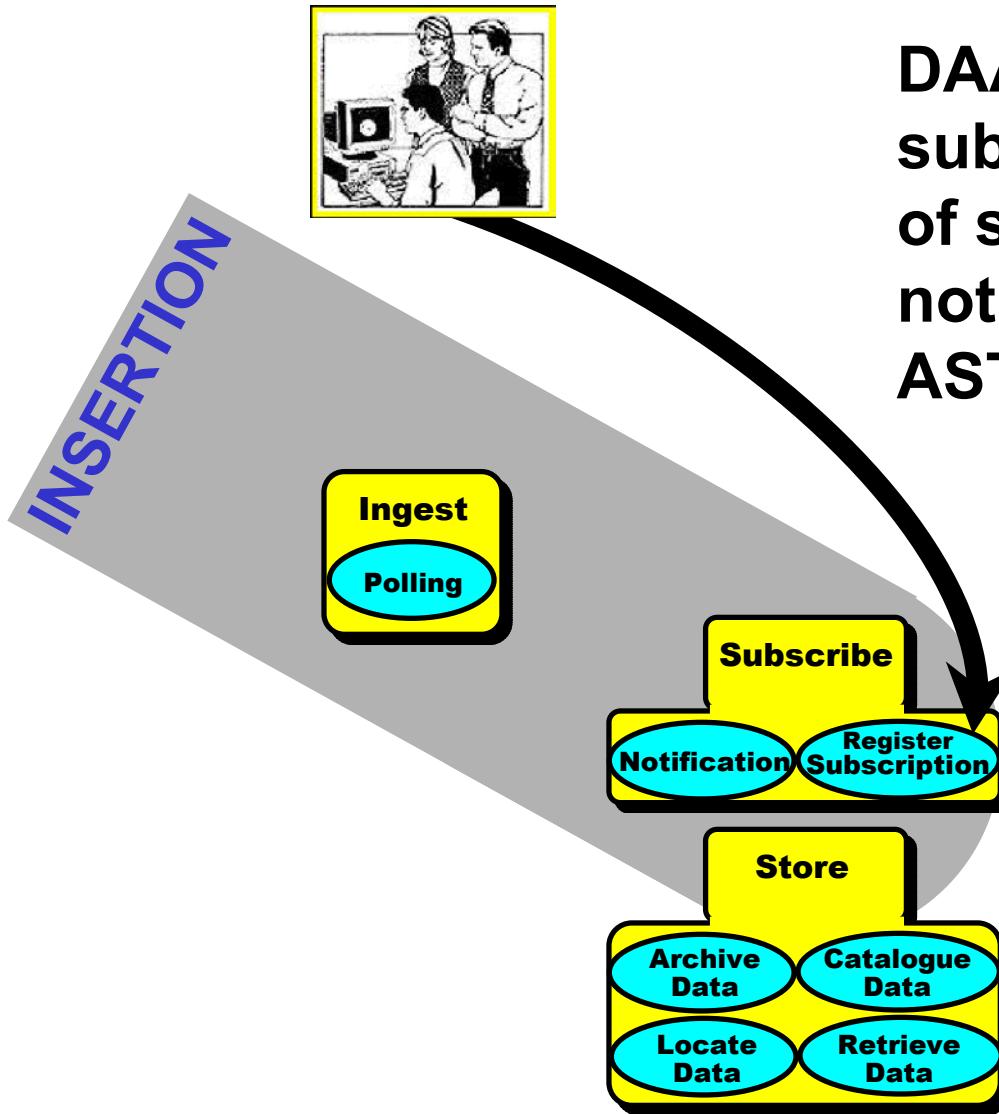
# ASTER Scenario: Expedited Data



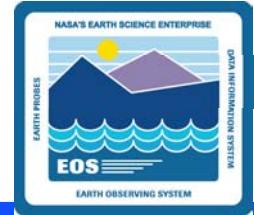
**Data Subscription**  
**Data Insertion**  
**Data Notification**



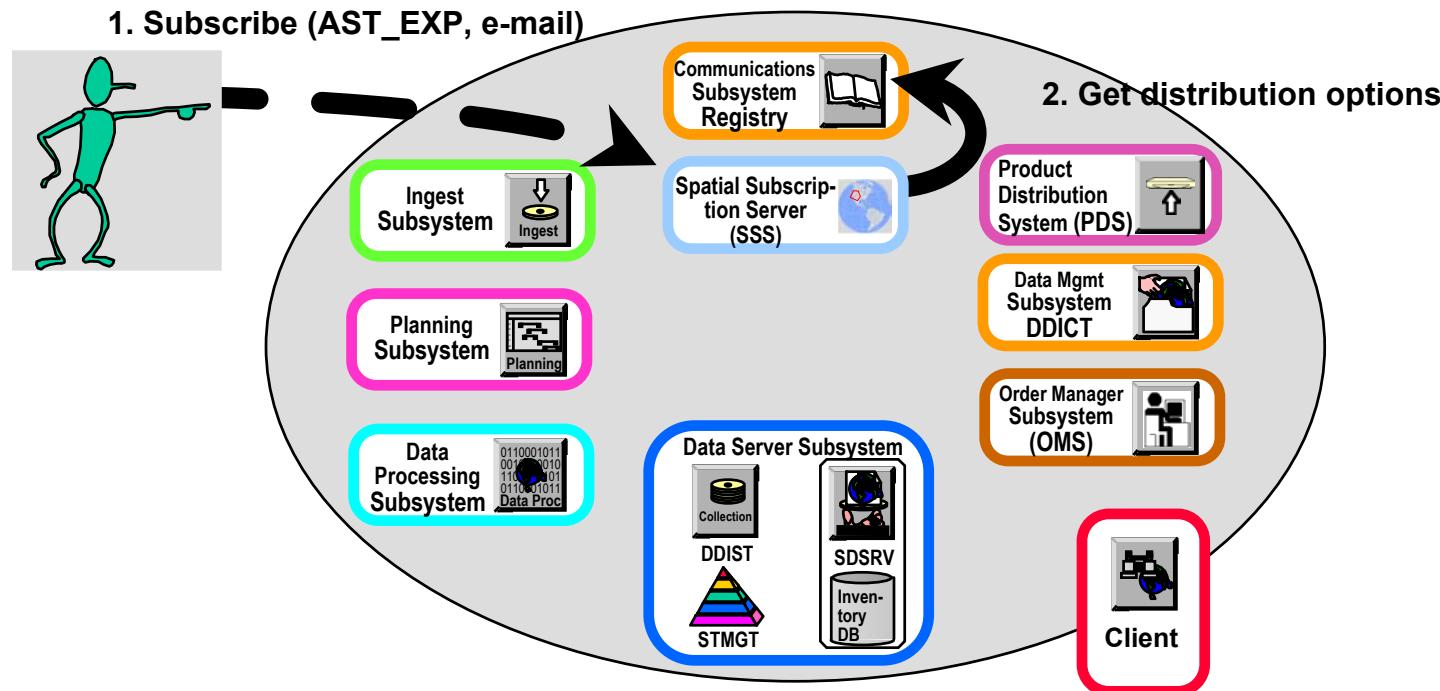
# Expedited Data



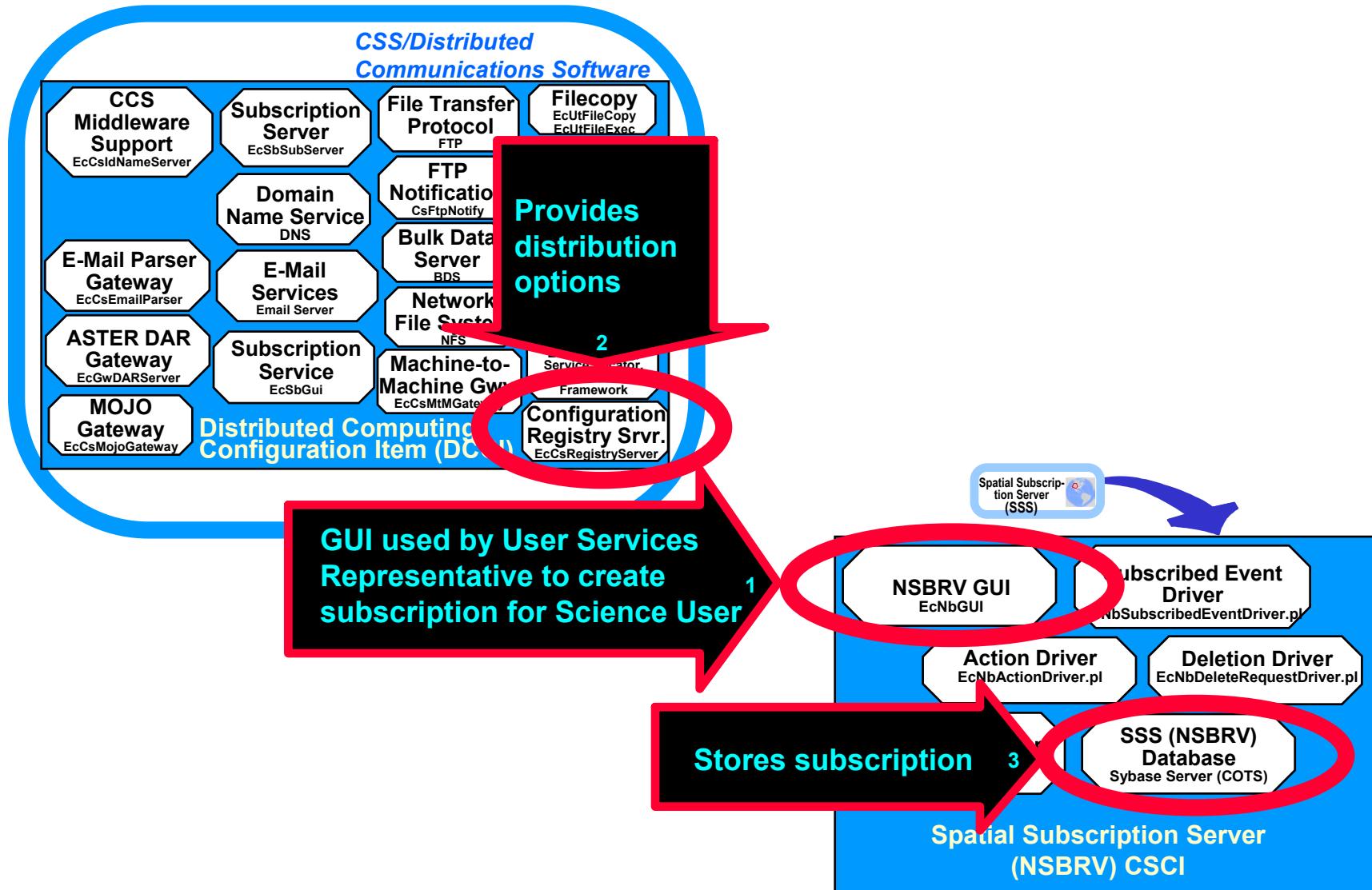
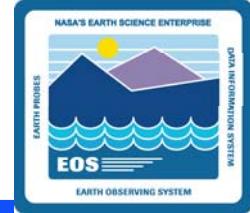
# ASTER: User Subscription Registration for AST\_EXP Process



DAAC enters subscription, on behalf of scientist, for e-mail notification of newly inserted ASTER Expedited Data product.

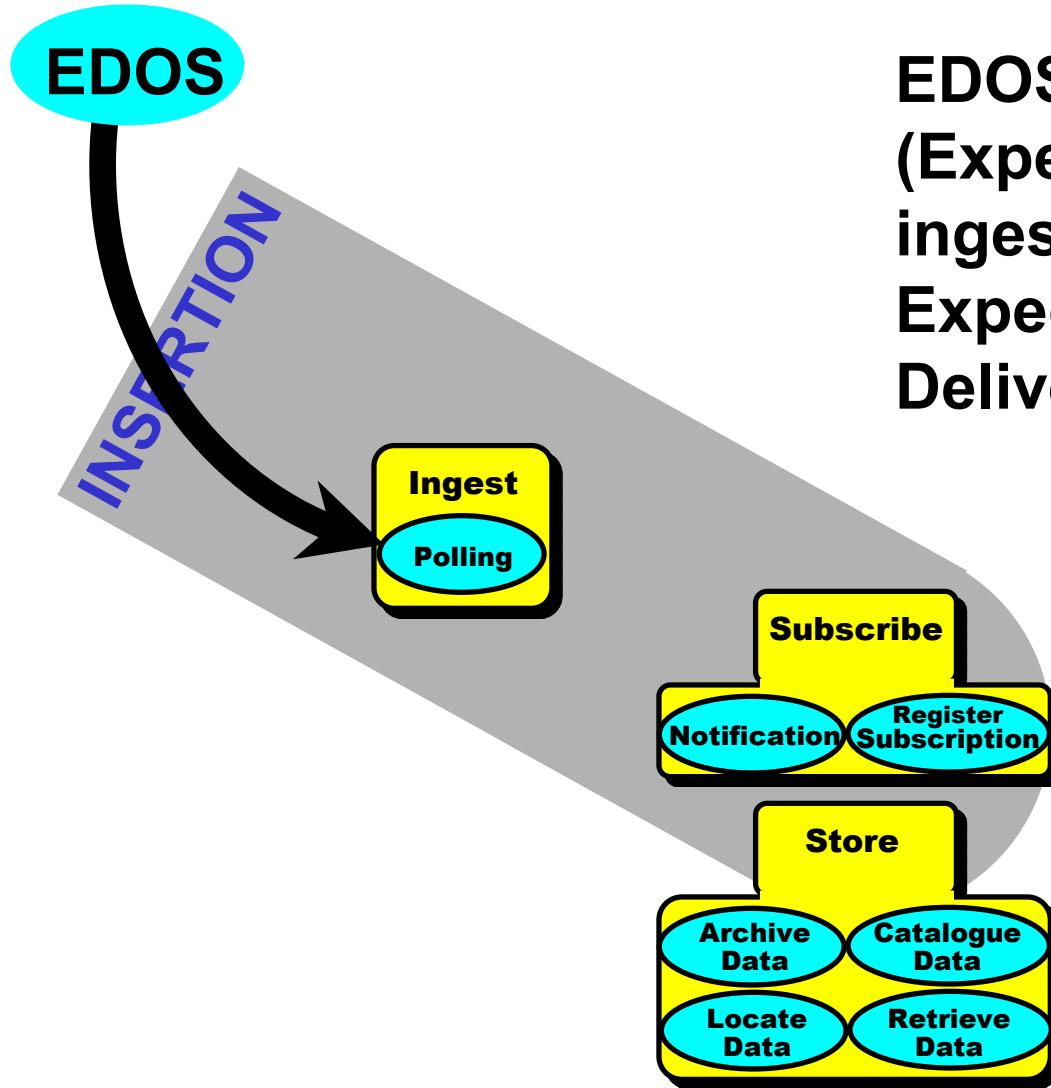


# ASTER: CSCI/Component Role in AST\_EXP Subscription Registration



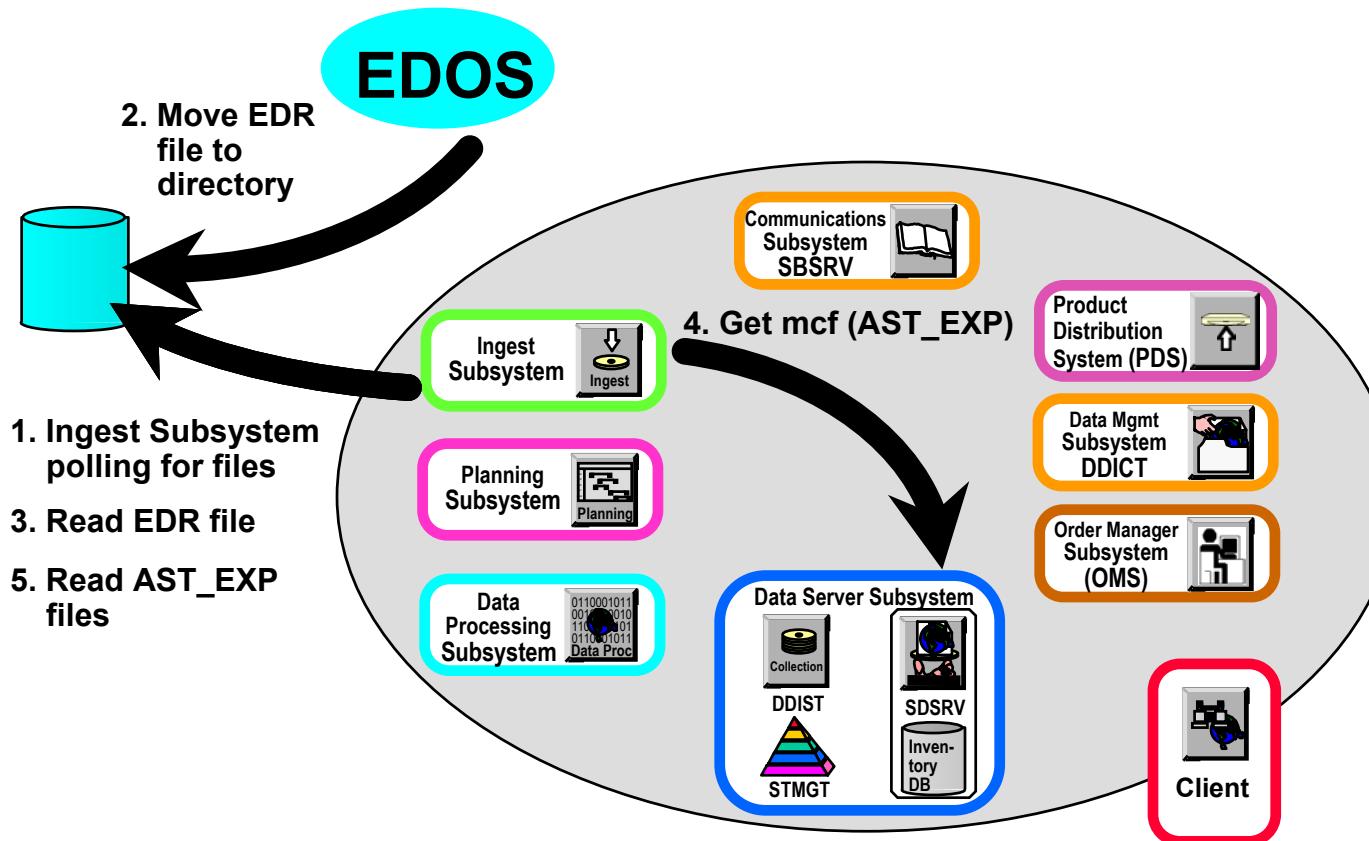
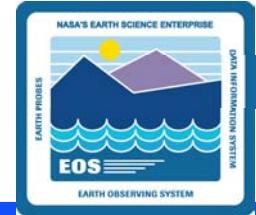


# Expedited Data (Cont.)



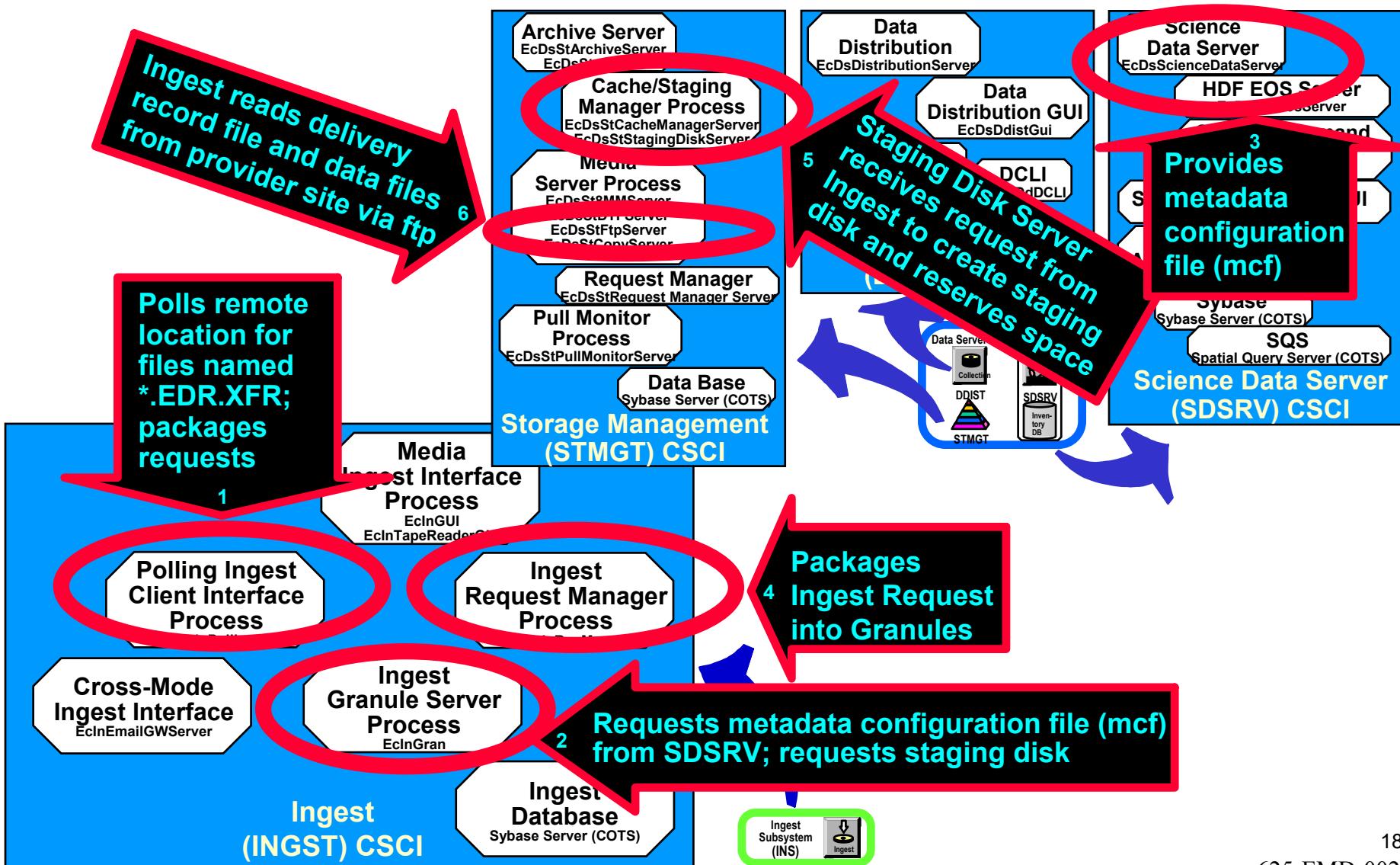
**EDOS initiates AST\_EXP  
(Expedited Data)  
ingestion via EDOS  
Expedited Data Set  
Delivery Record (EDR)**

# ASTER: Polling Ingest for AST\_EXP Process



Ingest begins polling specified location (directory), looking for an Expedited Data Set Delivery Record (EDR) file. EDOS transfers the file, via ftp, to the predetermined directory. (Location, directory, username, and password are as specified in the EDOS-ECS Operations Agreement.)

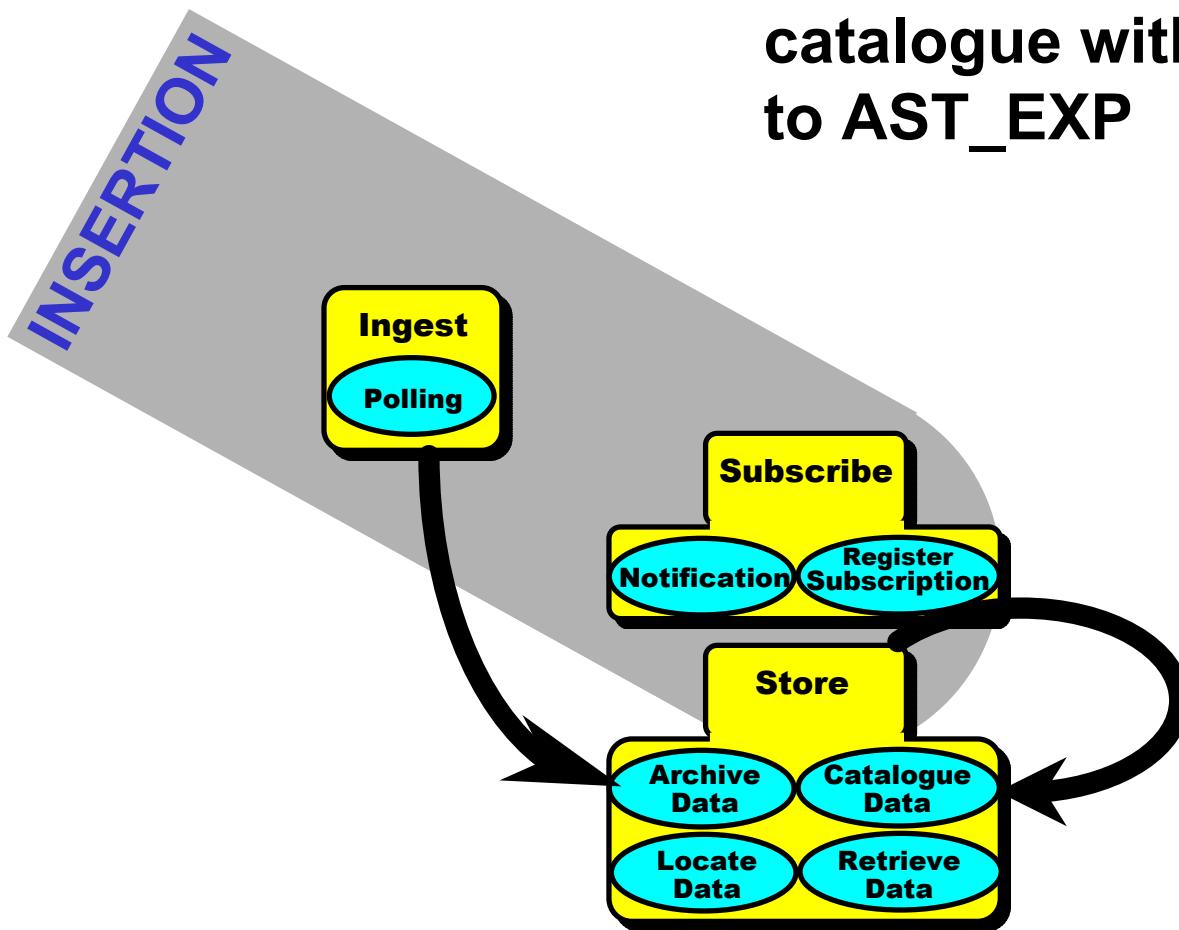
# ASTER: CSCI/Component Role in Polling Ingest for AST\_EXP



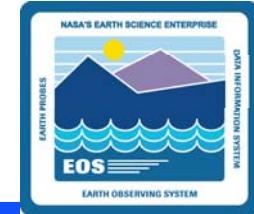


# Expedited Data (Cont.)

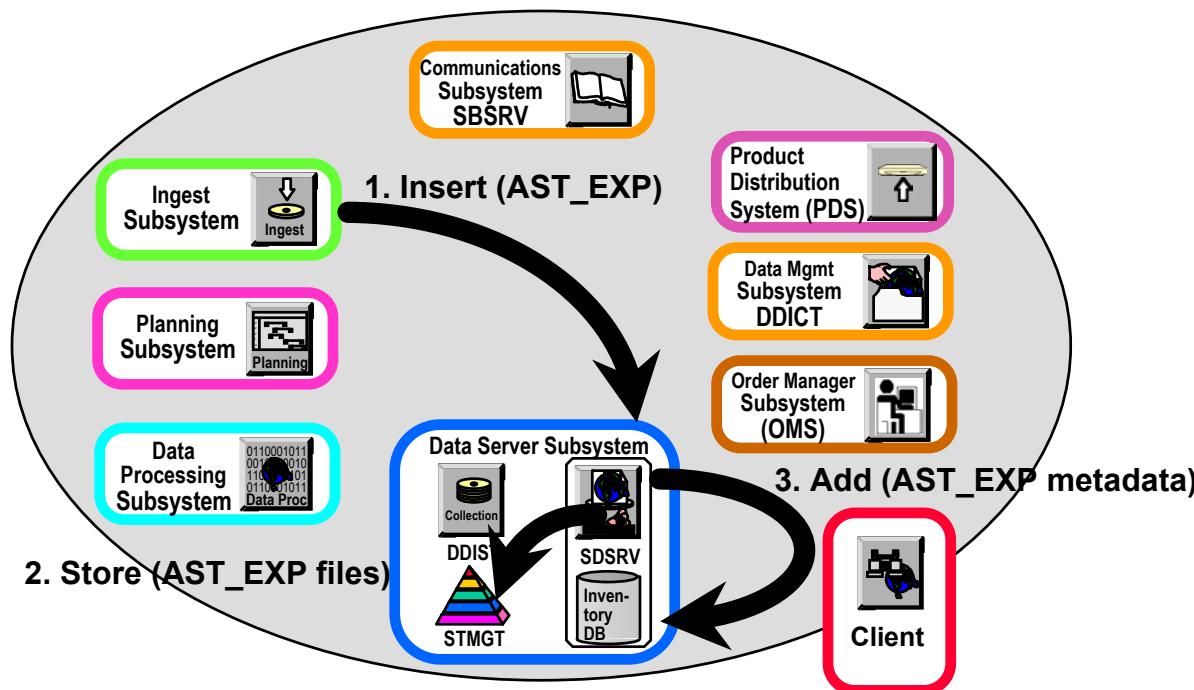
Archive ingested  
AST\_EXP data; update  
catalogue with reference  
to AST\_EXP



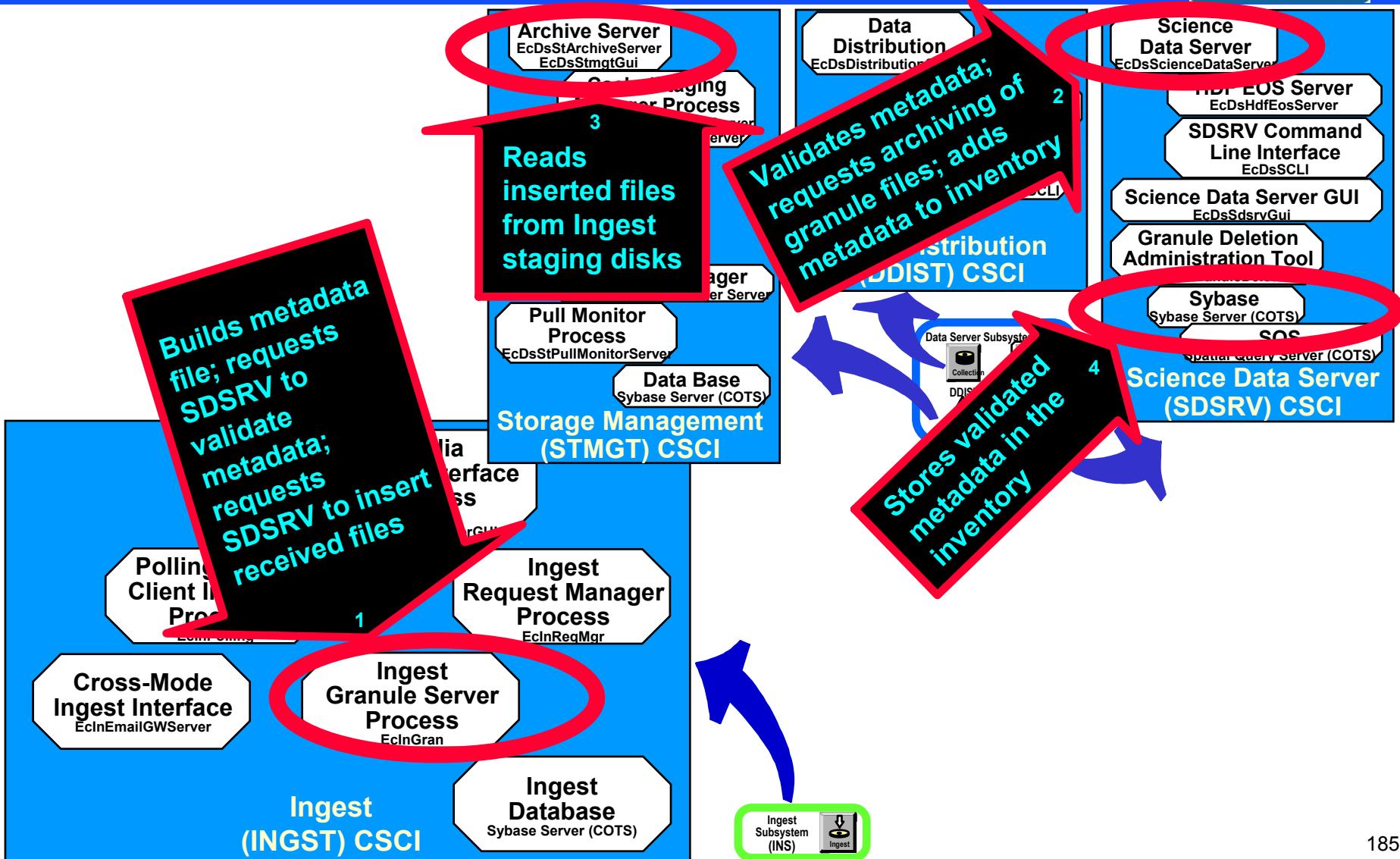
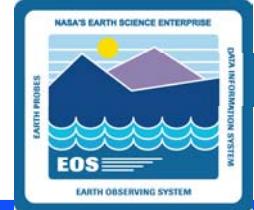
# ASTER: AST\_EXP Insertion Process



Newly ingested AST\_EXP granule is archived; inventory is updated.



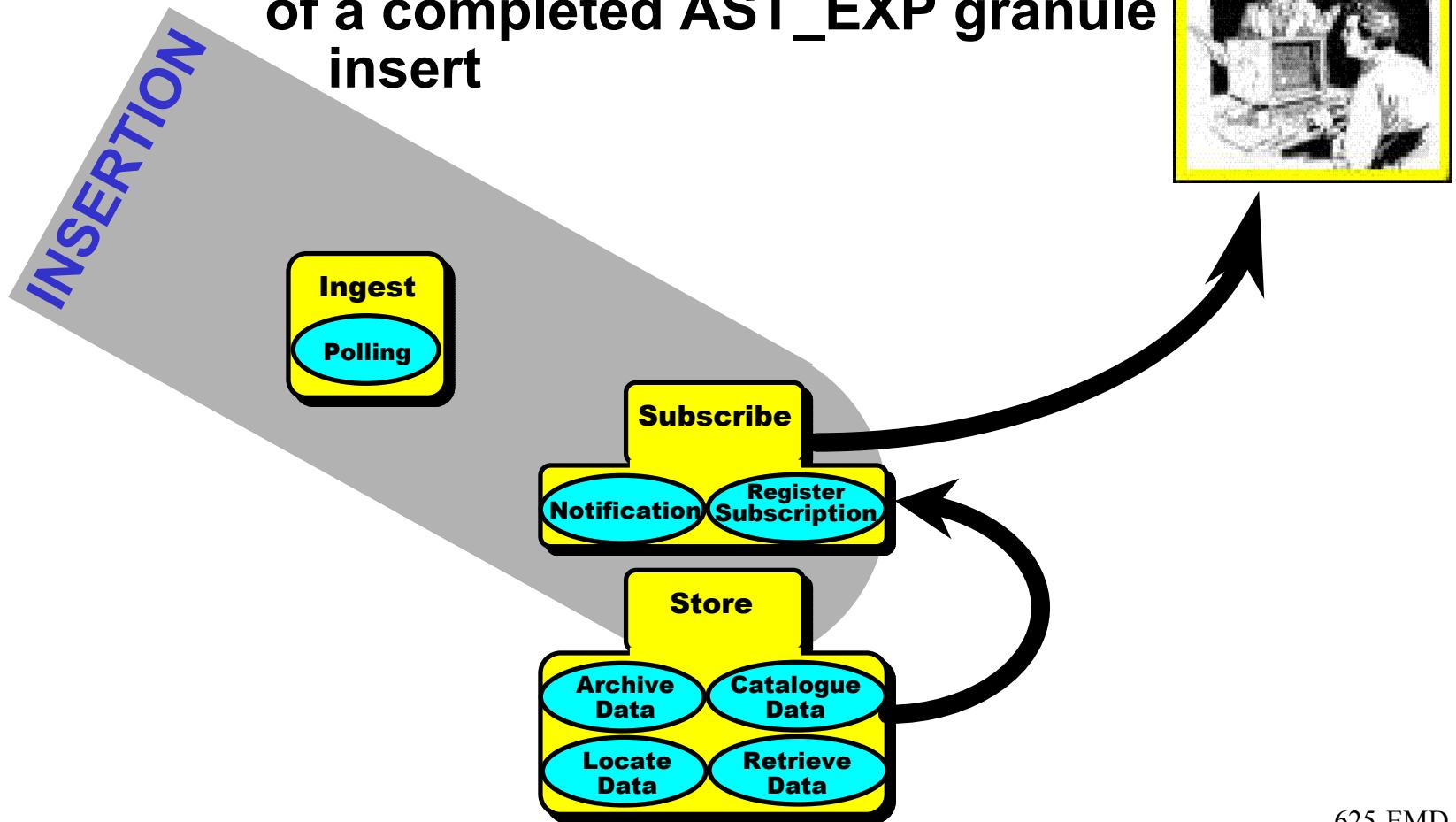
# ASTER: CSCI/Component Role in AST\_EXP Insertion



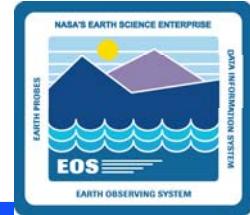


# Expedited Data (Cont.)

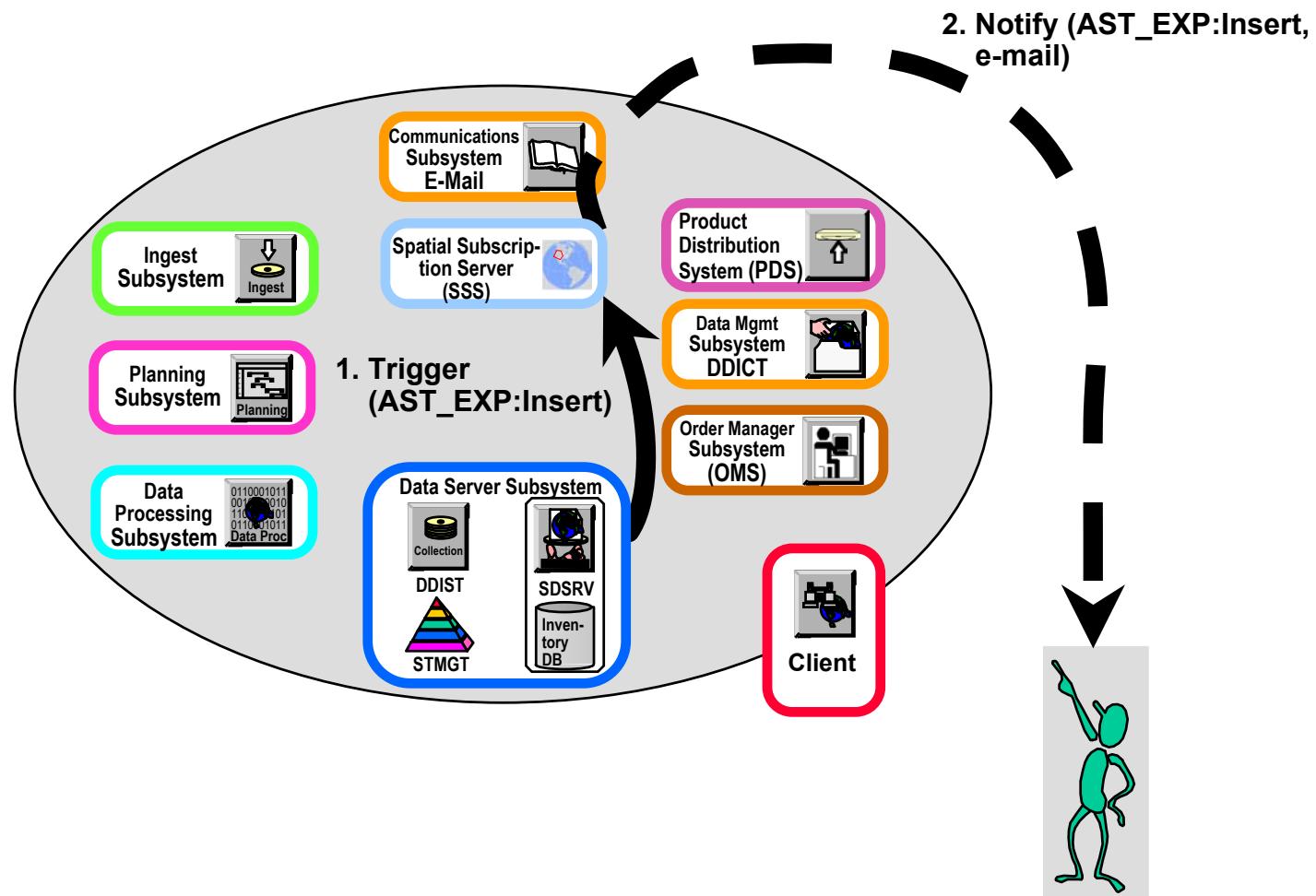
Insert in the SDSRV database triggers an event in the NSBRV database. Subscribe e-mails ASTER Scientist notice of a completed AST\_EXP granule insert



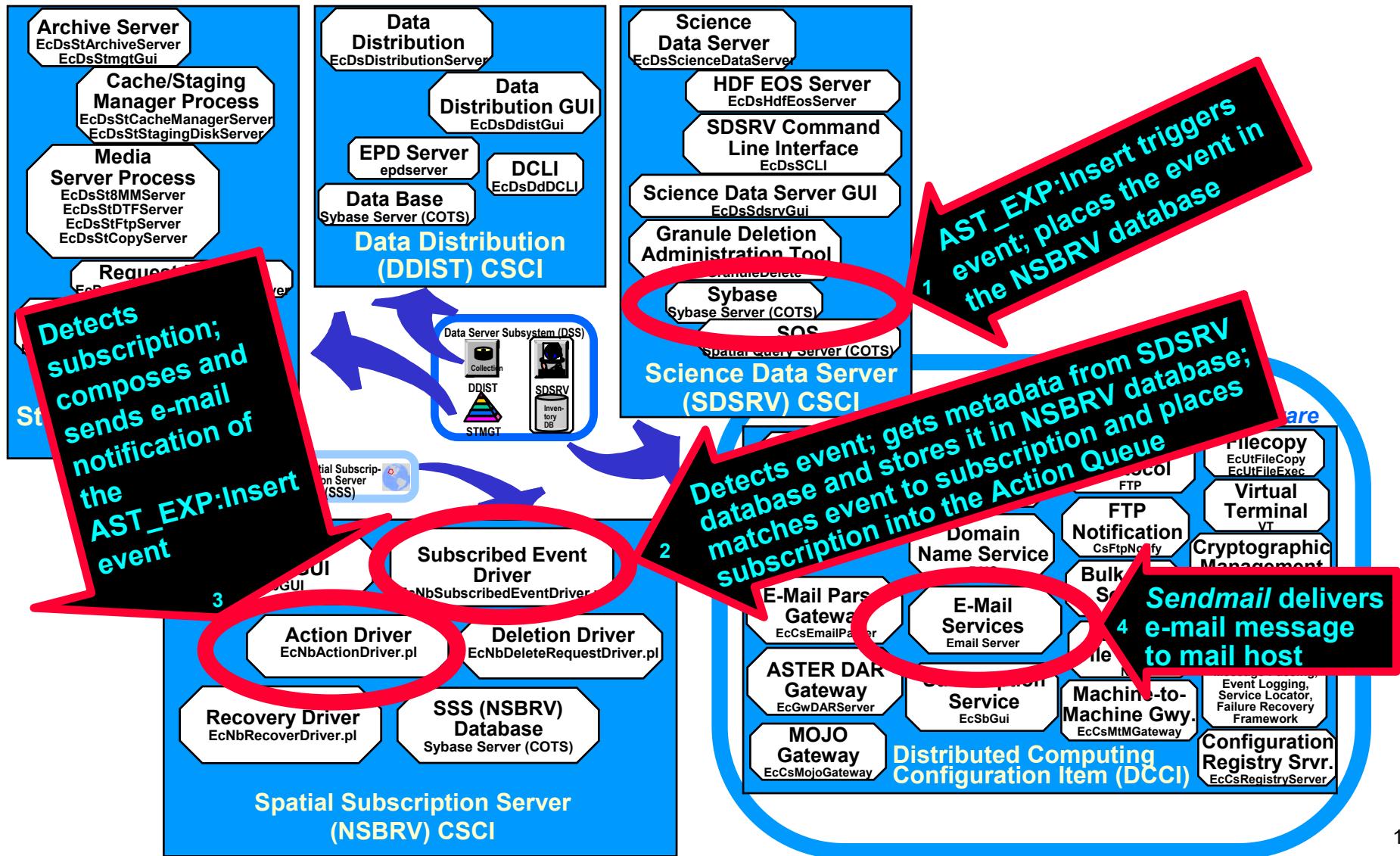
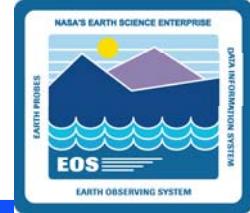
# ASTER: AST\_EXP Event Notification Process



Notify all AST\_EXP:Insert event subscribers.



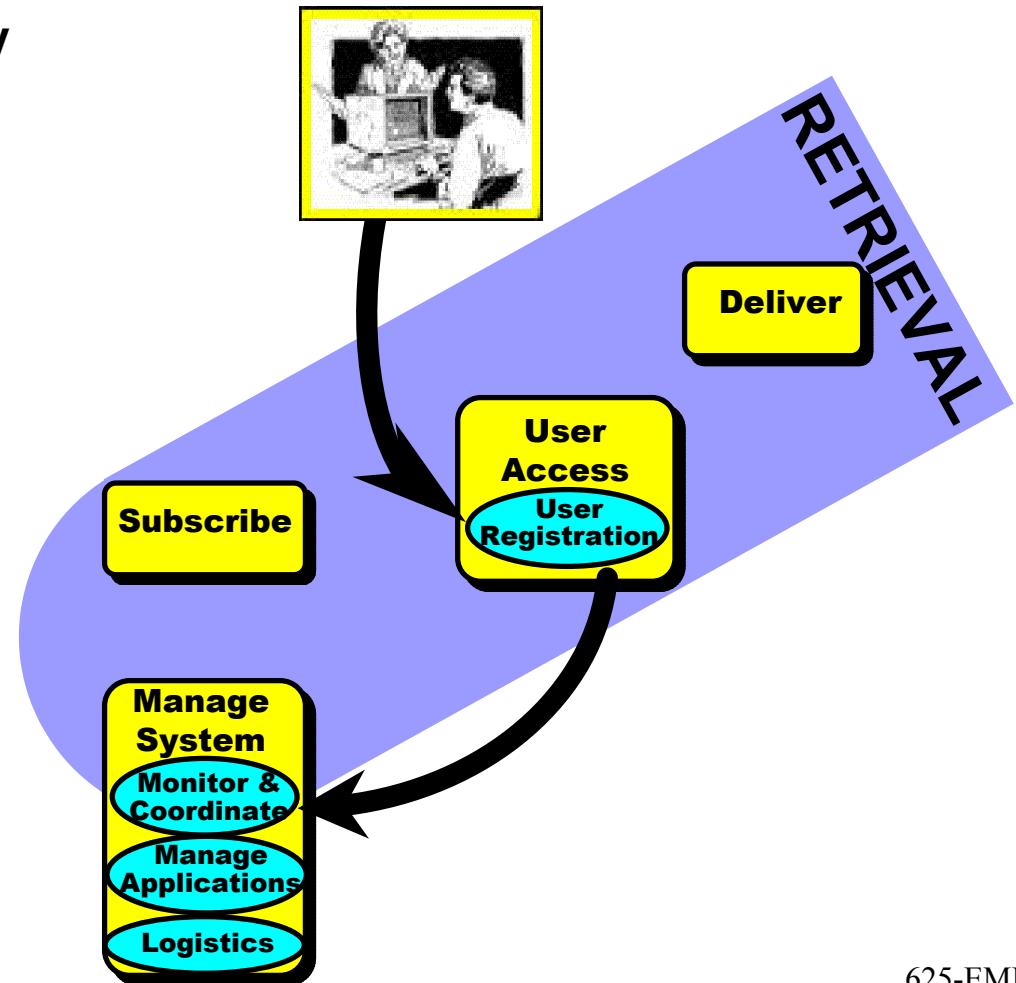
# ASTER: CSCI/Component Role in AST\_EXP Event Notification



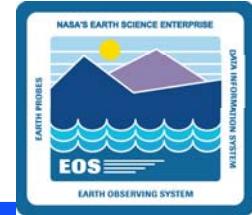


# User Registration

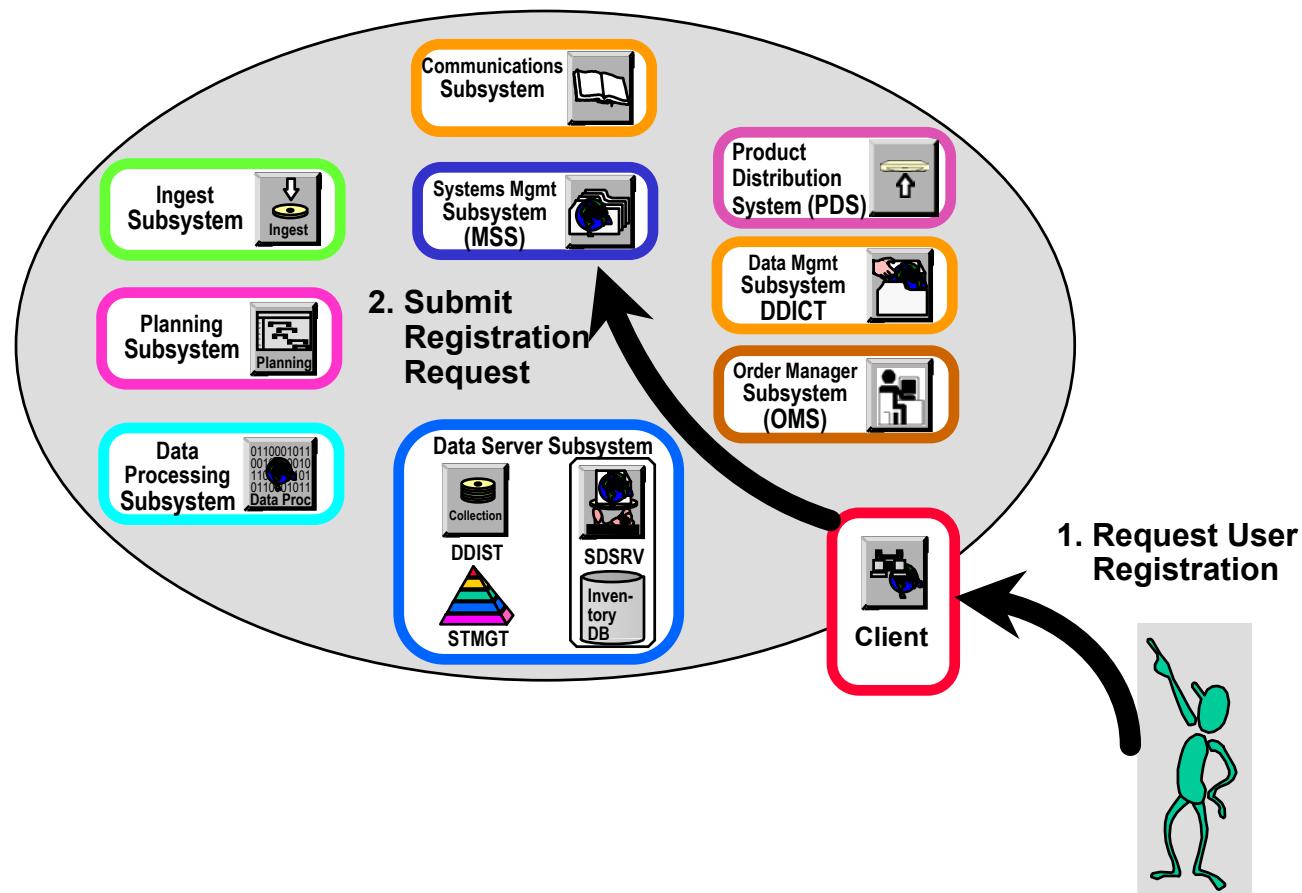
Science User starts the form for first-time User Registration from the EOS Data Gateway Web Client and submits registration information.



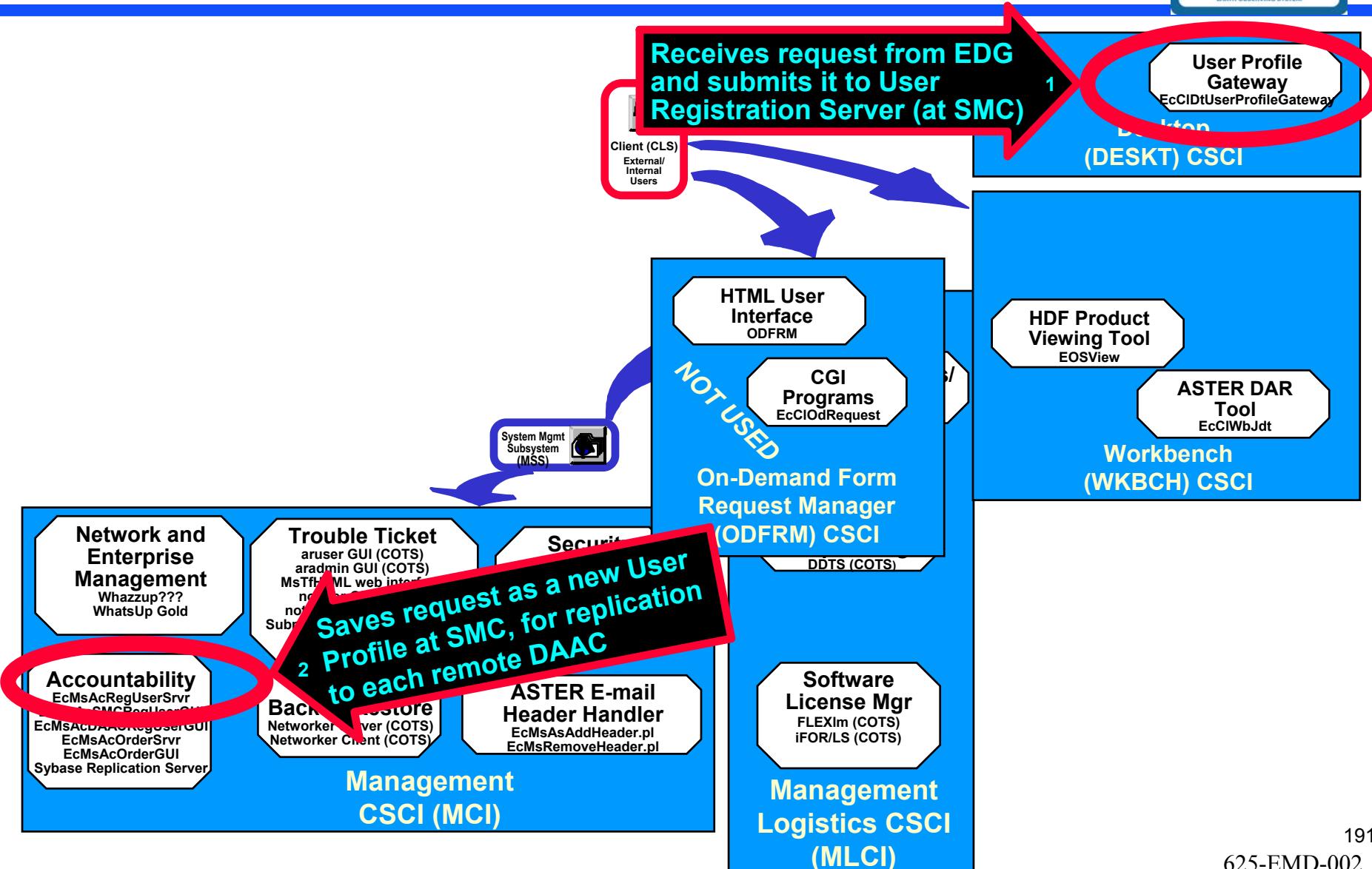
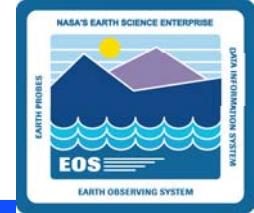
# User Registration Request Process



Scientist invokes the form for first-time User Registration from the EOS Data Gateway web client and then enters and submits registration data.



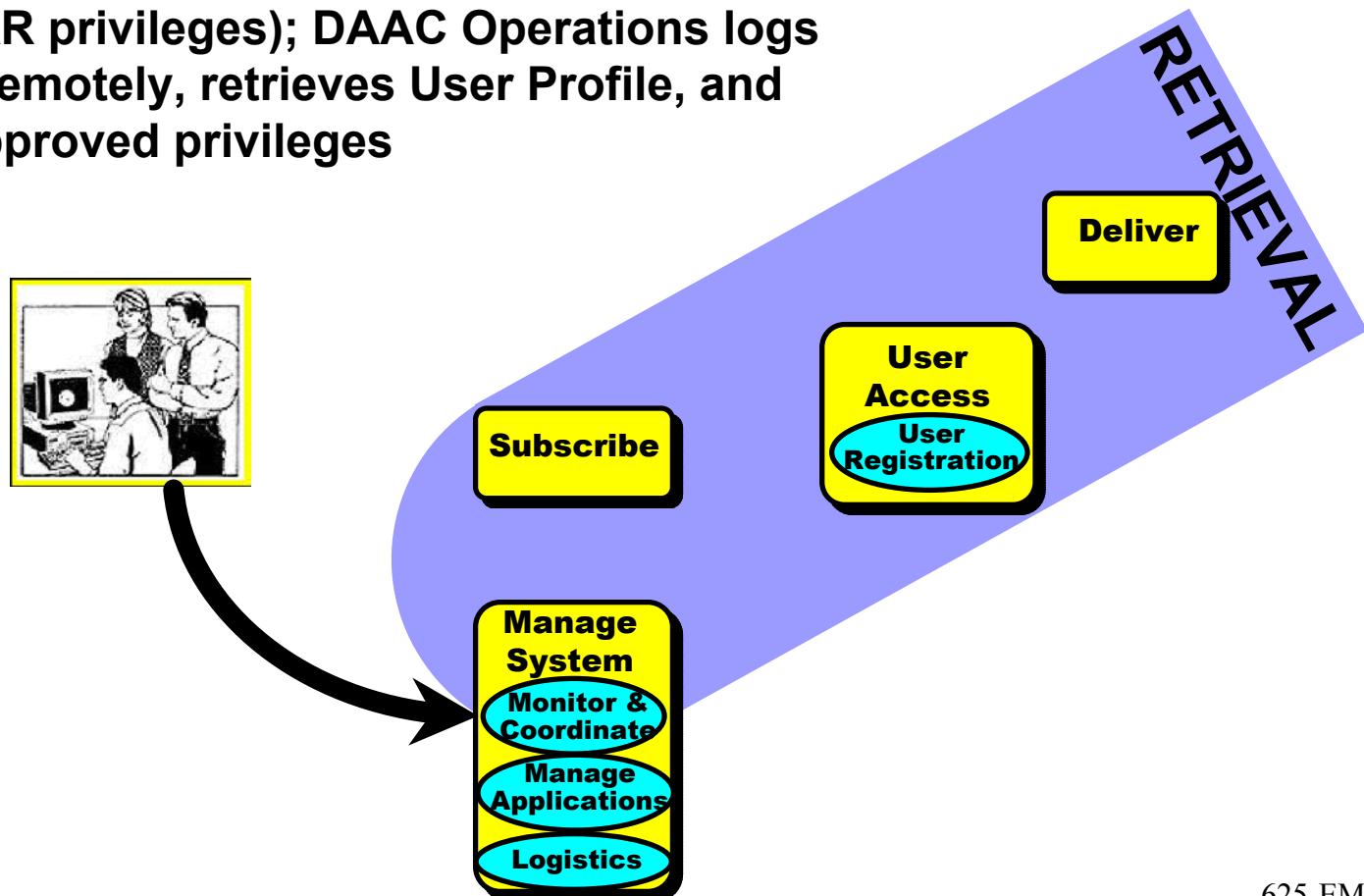
# CSCI/Component Role in User Registration Request





# User Registration (Cont.)

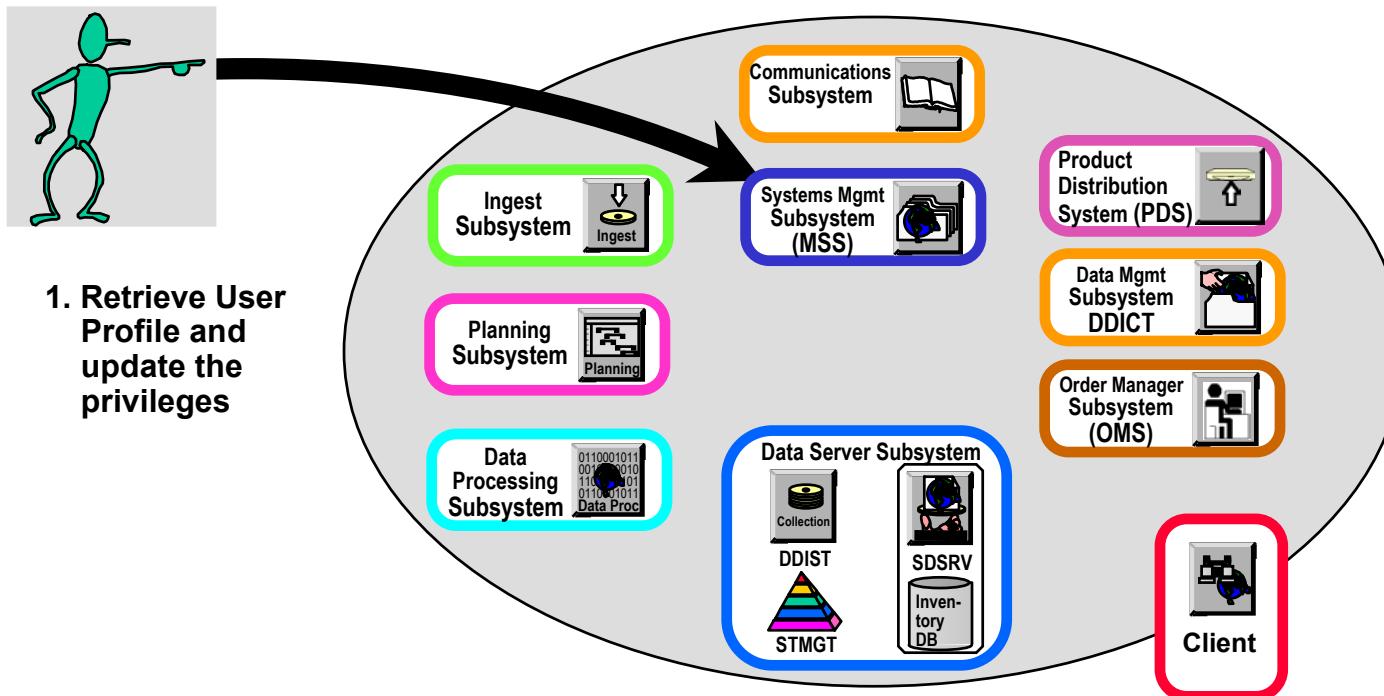
Science User calls home DAAC Operations (User Services) to request any needed privileges (e.g., access to restricted granules, ASTER DAR privileges); DAAC Operations logs into SMC remotely, retrieves User Profile, and assigns approved privileges



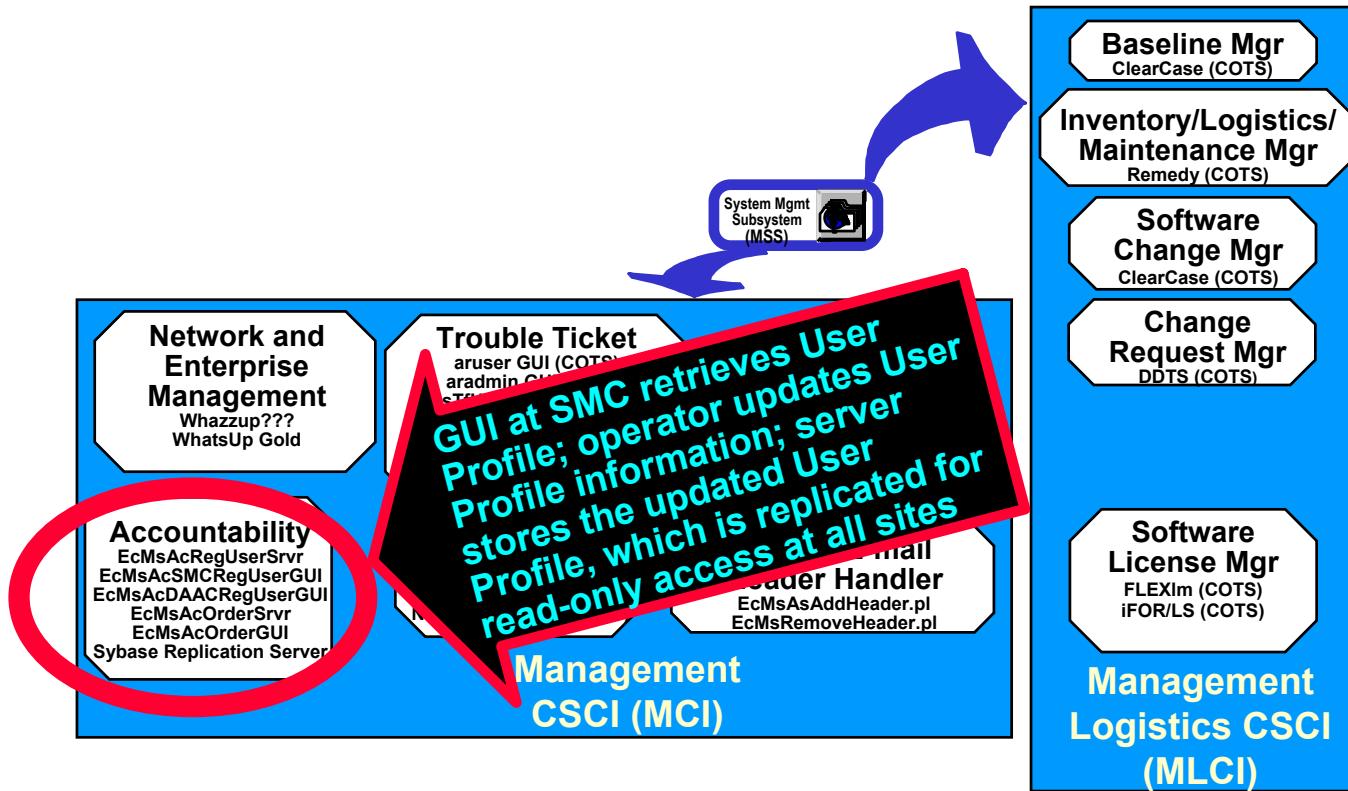
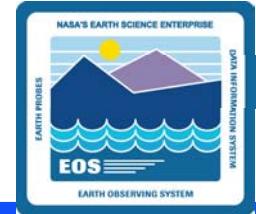


# User Registration Approval Process

DAAC User Services Representative at home DAAC uses User Registration Server Graphical User Interface (GUI) at SMC to retrieve User Profile and update the MSS User Profile approved privileges, which are then replicated.



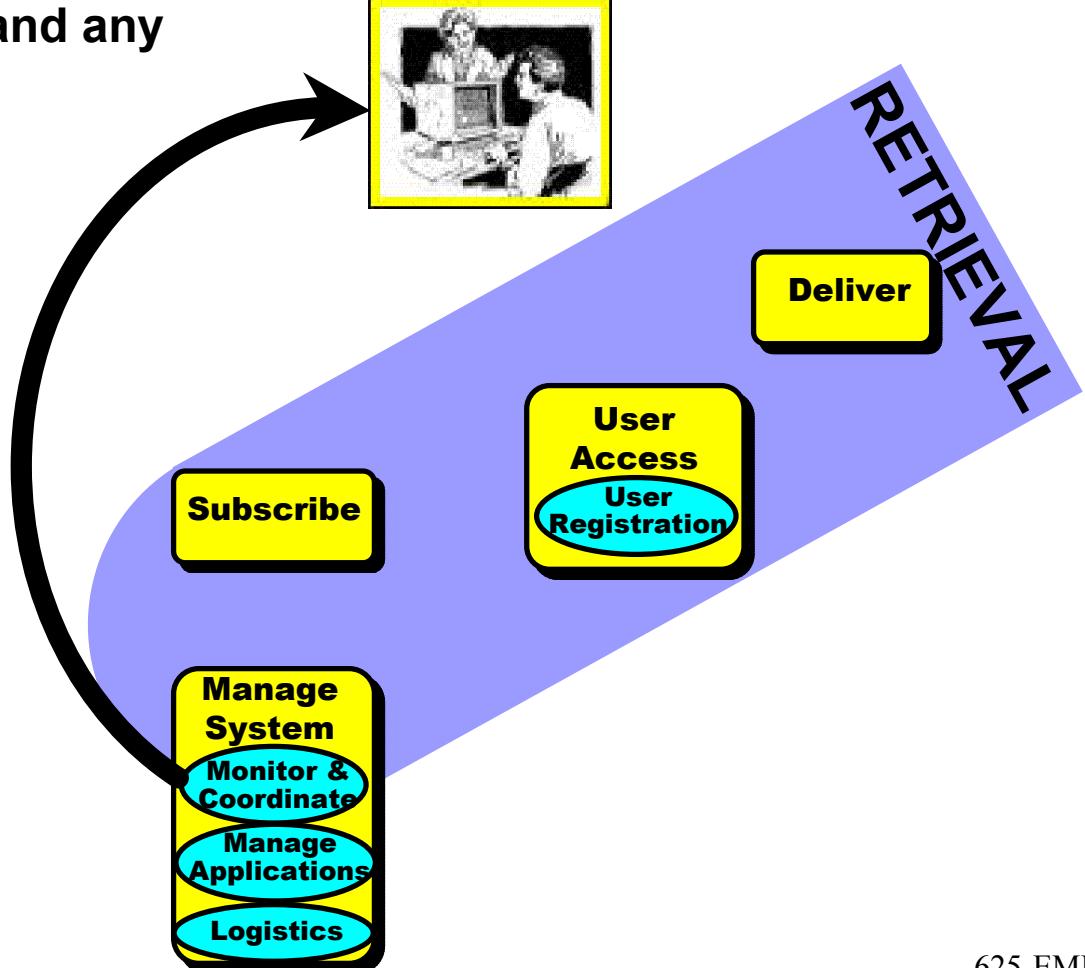
# CSCI/Component Role in User Registration Approval



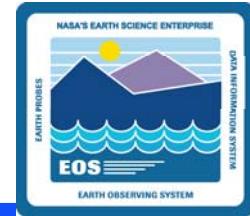


# User Registration (Cont.)

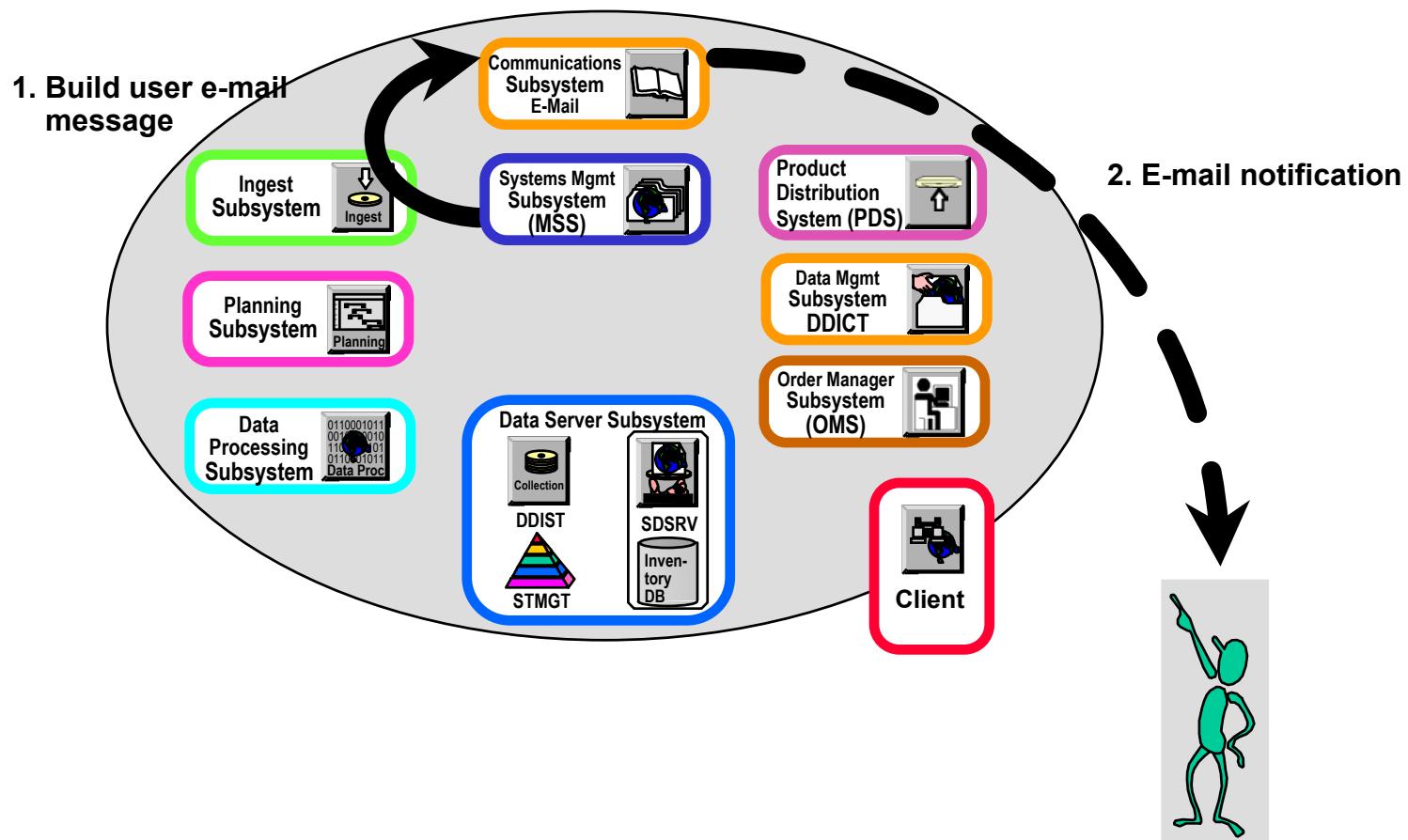
System Management Subsystem (MSS)  
sends e-mail to the Science User  
confirming registration and any  
special privileges



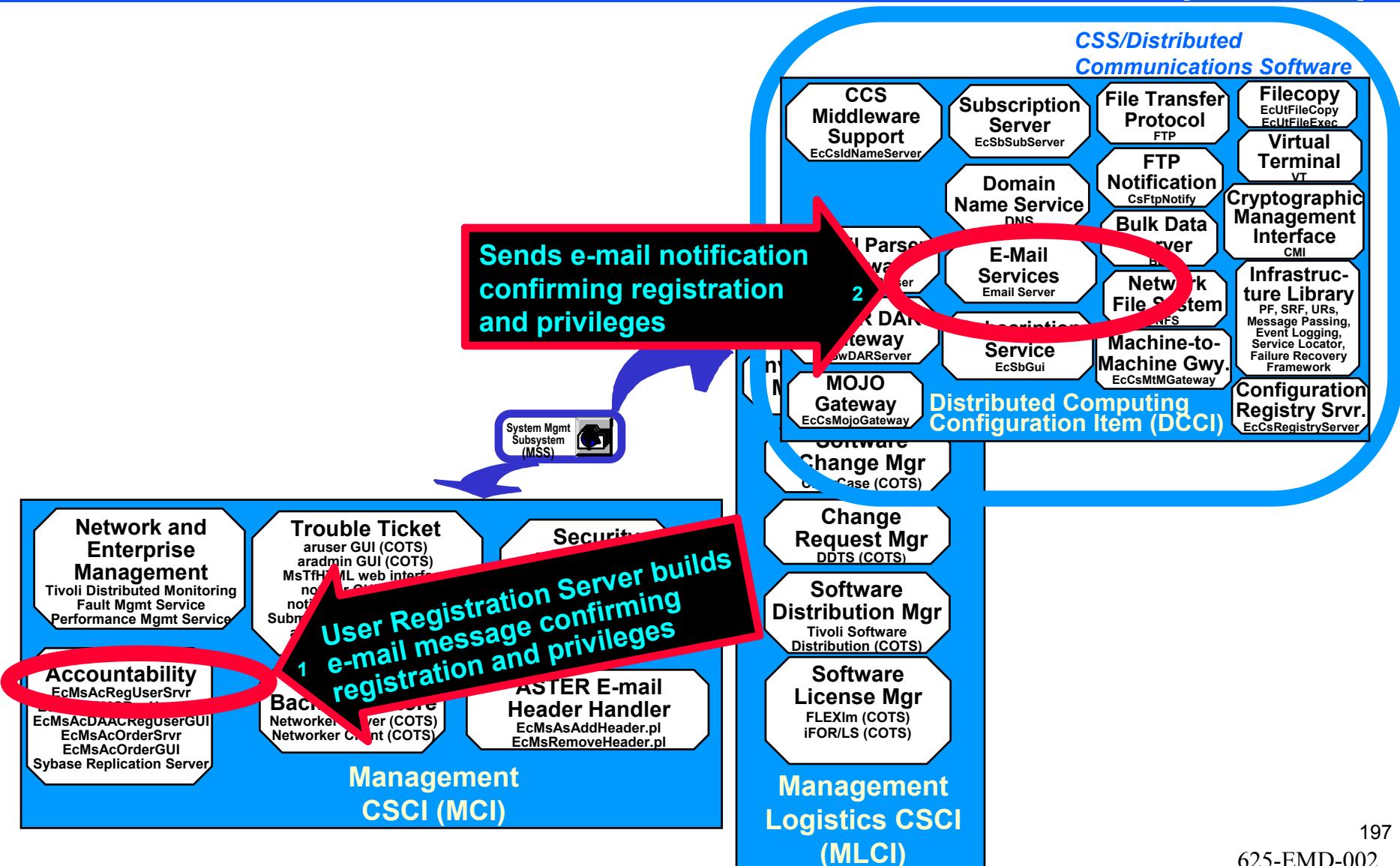
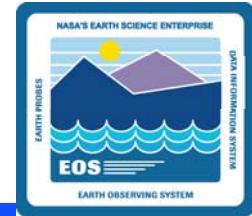
# User Registration Confirmation Process

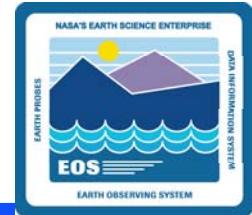


**System Management Subsystem (MSS) User Registration Server** creates and sends e-mail to the Science User confirming registration and any special privileges.



# CSCI/Component Role in User Registration Confirmation





# MODIS Scenario

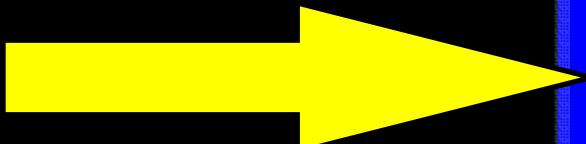


## MODIS

- 1 Automatic PGE Scheduling**
- 2 Chaining of PGEs**
- 3 Standing Orders**

### MODIS Goals

- *Standing Order Submittal*
- *Polling Ingest*
- *Standard Production and Chaining*
- *Data Access*



### MODIS Preconditions

#### *MODIS ESDTs Inserted into ECS*

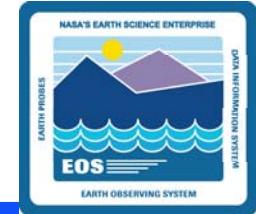
- *MOD000, MOD01, MOD02, MOD03, MOD07, MOD35, MODVOLC, MOD35ANC, GDAS\_0ZF, Others*

#### *MODIS PGEs passed SSI&T and installed*

- *PGE01, PGE02, PGE03*

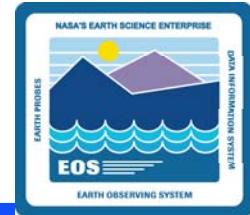
#### *Ancillary and static data inserted into Data Server*

# MODIS Scenario: Data Access

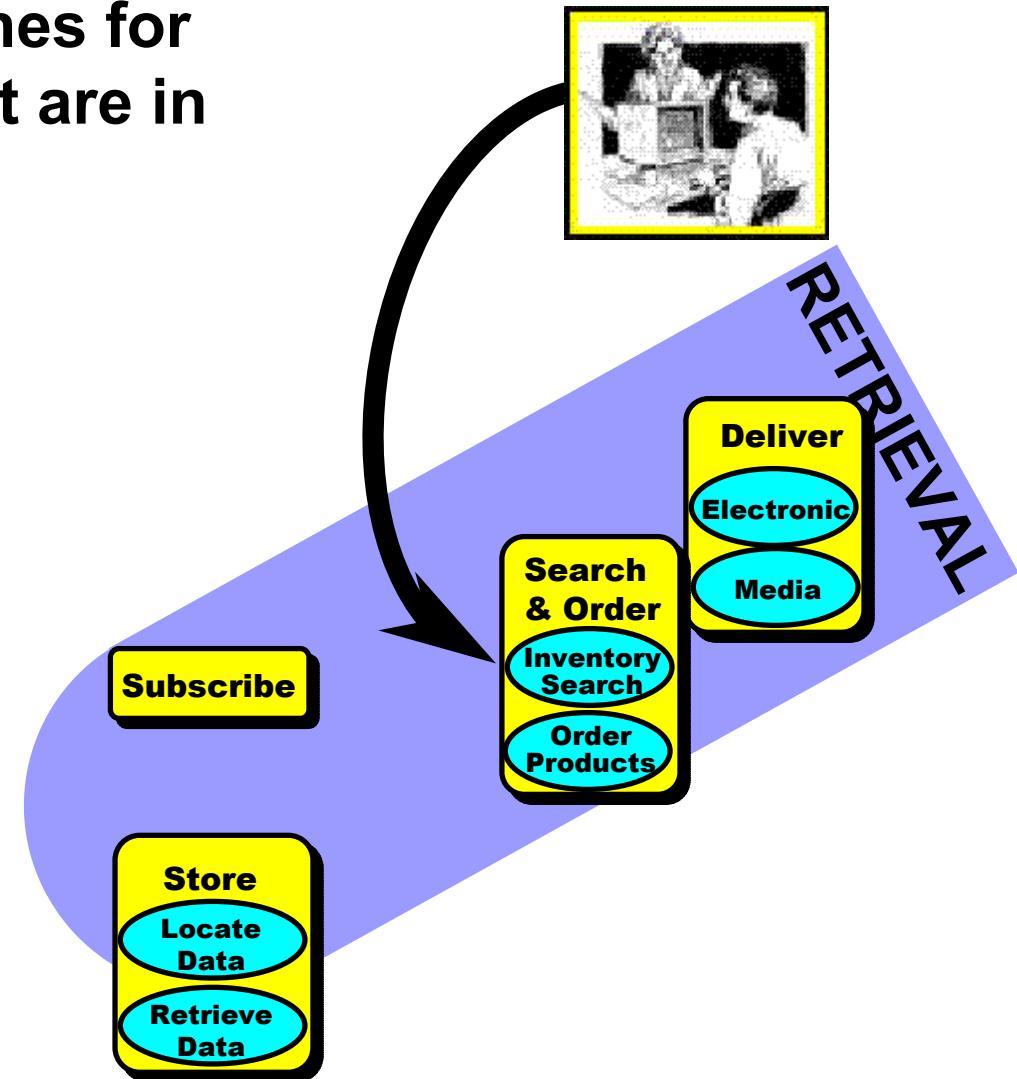


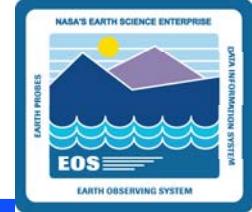
## Search & Order Granules

# MODIS: Data Access



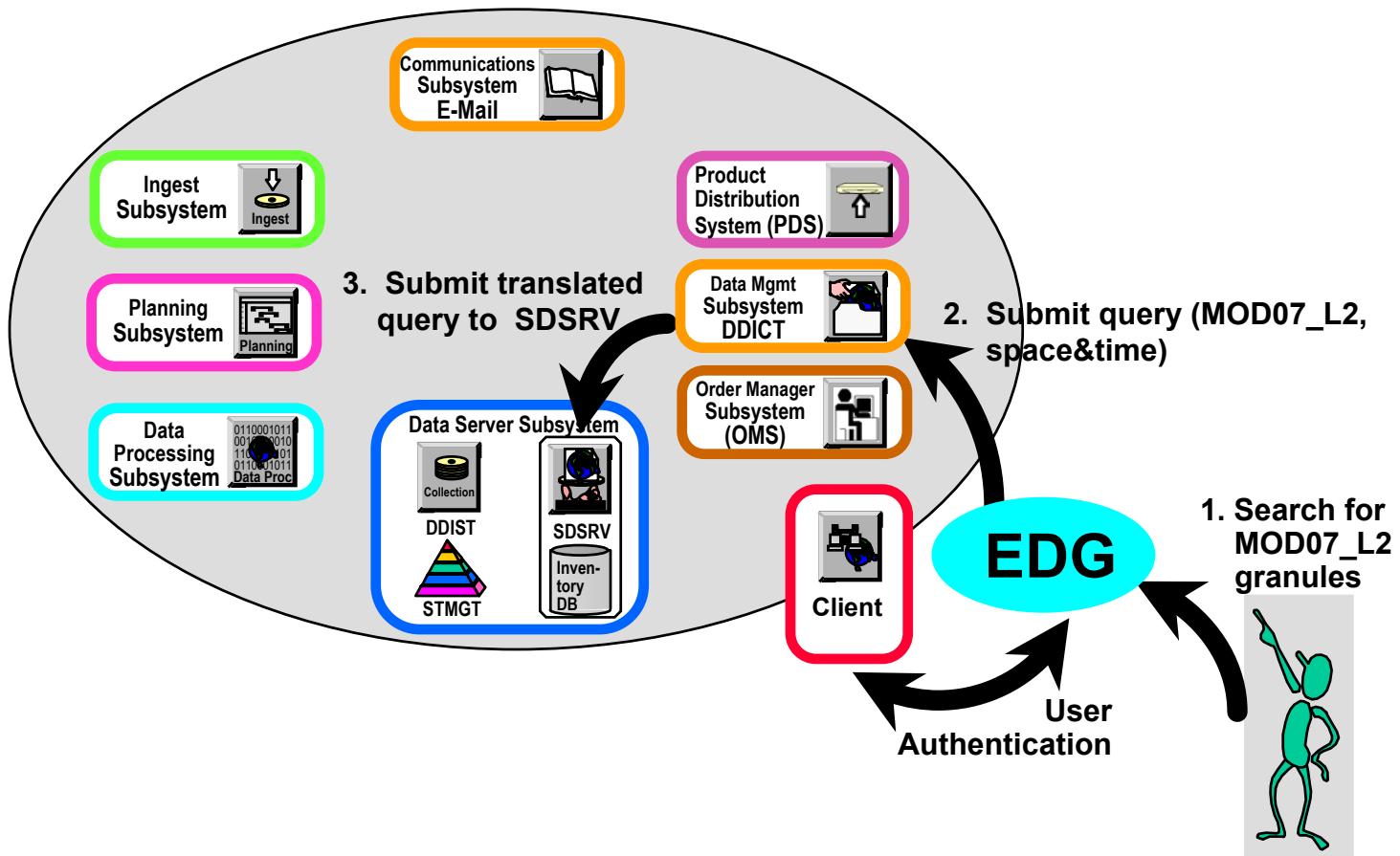
Science User searches for  
MODIS granules that are in  
ECS data holdings



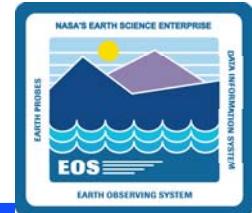


# MODIS: Inventory Search Process

Science User uses EOS Data Gateway (EDG) Web Client to perform an Inventory Search for MOD07\_L2 data (MODIS Level 2 Joint Atmosphere Product of profiles, ozone, water, and other components) over a specified spatial/temporal domain.



# MODIS: CSCI/Component Role in Inventory Search



**Translates search criteria to a search object and submits query to SDSRV Search service**

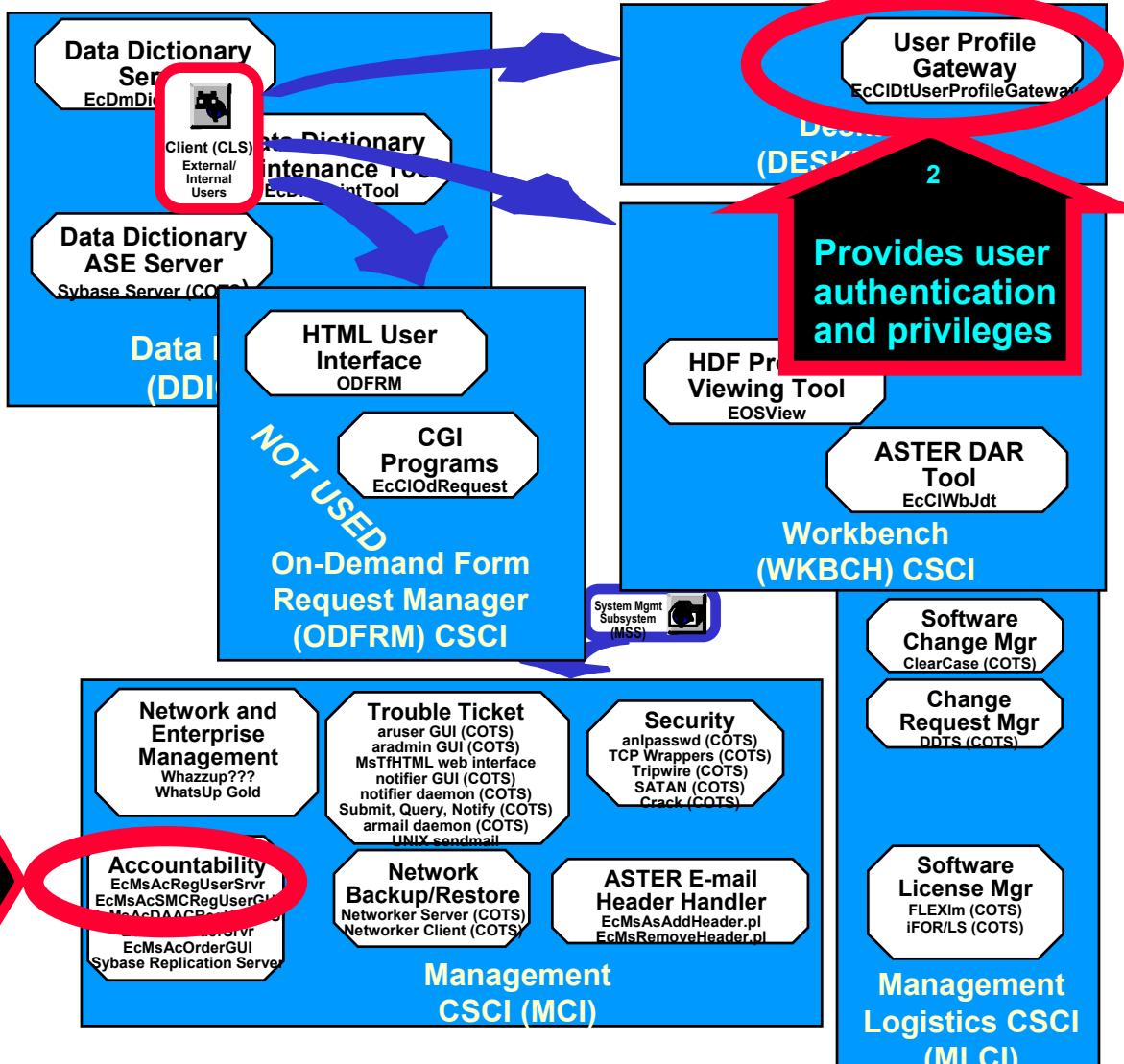
3

V0 to ECS Gateway Server  
EcDmV0ToECSGateway

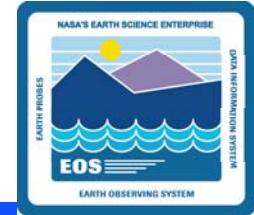
Version Zero Gateway (V0 GTWAY) CSCI

**Holds User Profile information**

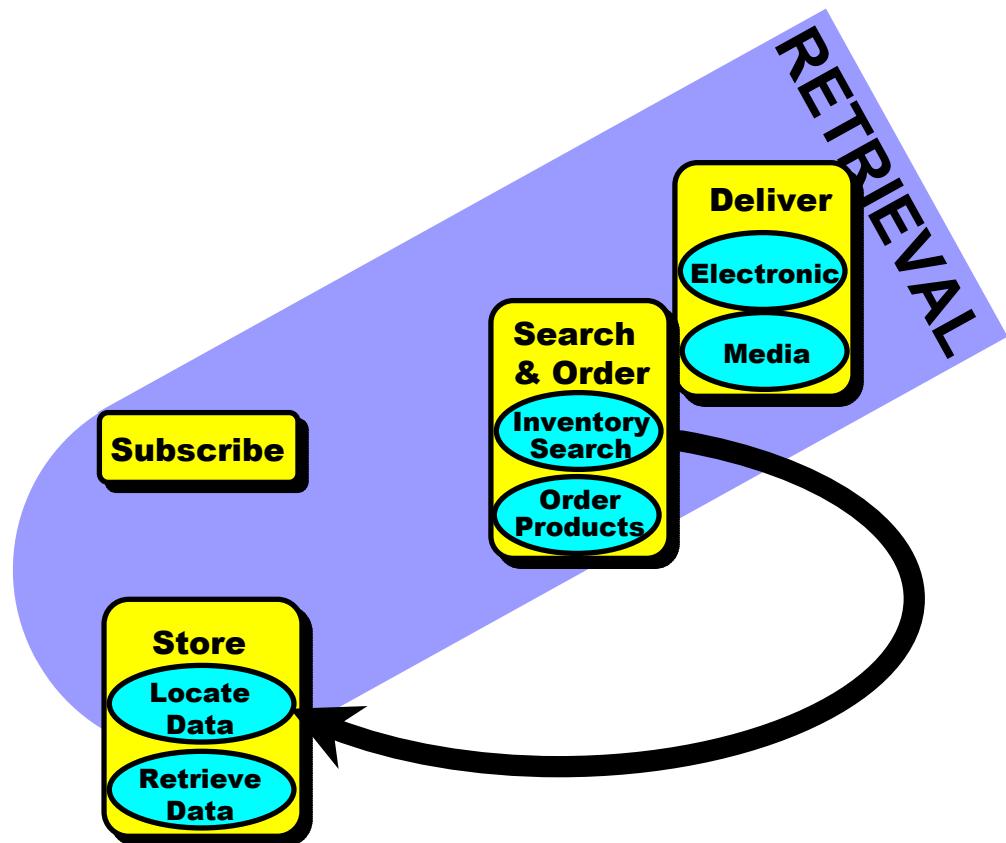
1

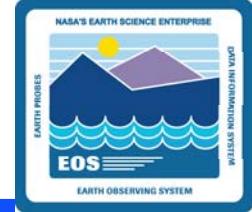


# MODIS: Data Access (Cont.)



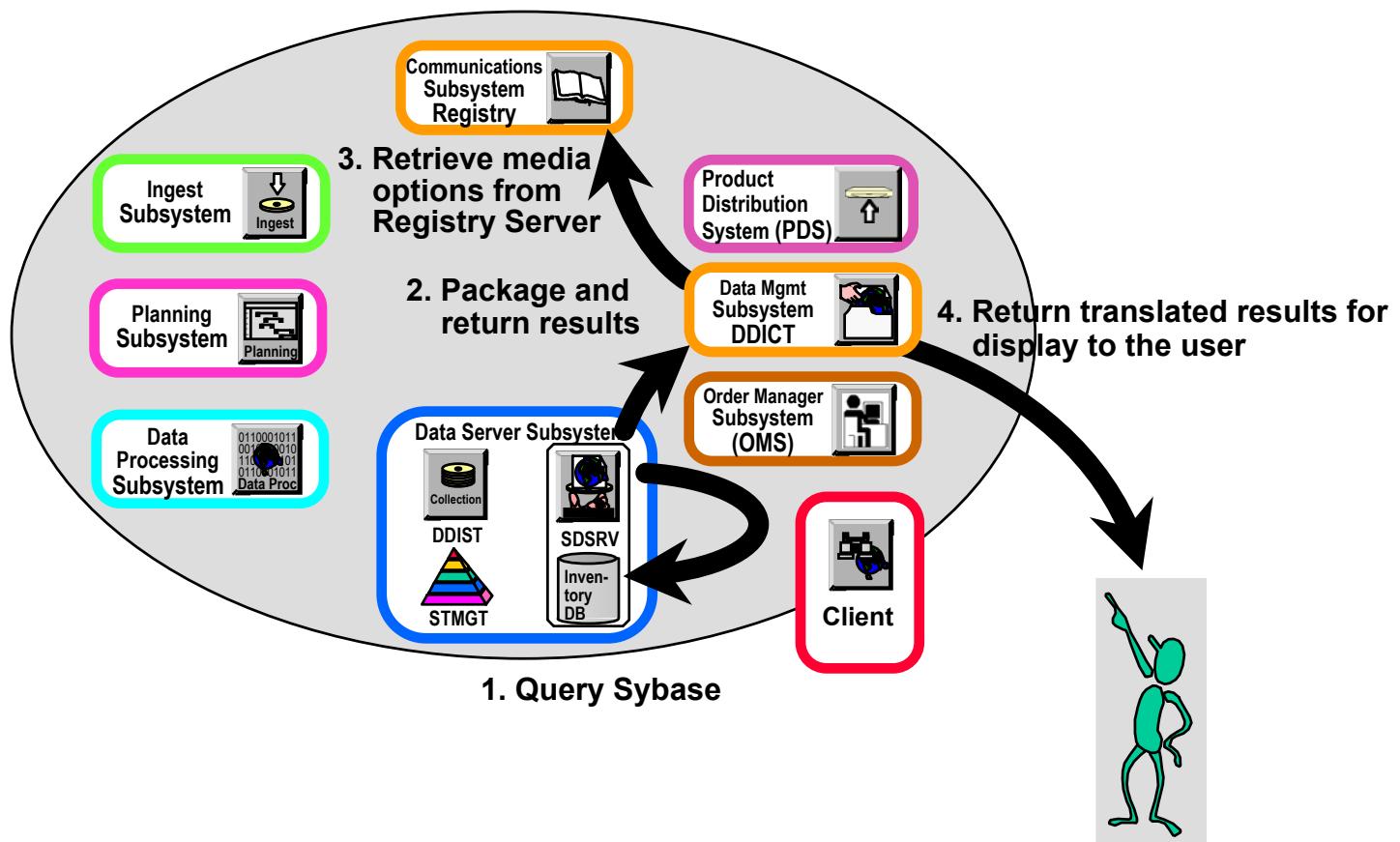
Scenes of interest are located  
in the ECS data holdings



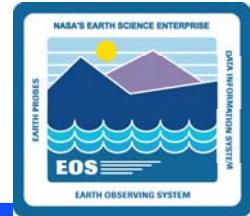


# MODIS: Data Search Process

SDSRV queries Sybase/SQS database for granules meeting search criteria and returns results.



# MODIS: CSCI/Component Role in Data Search



Translates results and returns them to the EOS Data Gateway Web Client for display to the user

4



Data Dictionary Server  
EcDmDictService

Data Dictionary Maintenance Tool  
EcDmMaintTool

Data Dictionary ASE Server  
Sybase Server (COTS)

**Data Dictionary (DDICT) CSCI**

**CSS/Distributed Communications Software**

CS Software  
EcSbServer

Subscription Server  
EcSbSubServer

File Transfer Protocol  
EcSbFtp

File Copy  
EcSbCopy

Parser  
EcSbParser

E-Mail Services  
Email Server

File Transfer  
EcSbTransfer

File Copy  
EcSbCopy

DAR DAR  
EcSbDAR

Subscription Service  
EcSbGui

Machine to Machine Gwy  
EcCsMtMGateways

Configuration Registry Srvr.  
EcCsRegistryServer

Science Data Server  
EcDsScienceDataServer

HDF-EOS Server  
EcDsHdfEosServer

SDSRV Command Line Interface  
EcDsSCLI

SDSRV Command Line Interface  
EcDsSCLI

Science Data Server GUI  
EcDsSdsrvGui

Granule Deletion Adminstrator  
EcDsGda

Sybase  
Sybase Server (COTS)

Science Data Server GUI  
EcDsSdsrvGui

Sybase  
Sybase Server (COTS)

Granule Deletion Adminstrator  
EcDsGda

Sybase  
Sybase Server (COTS)

Science Data Server (SDSRV) CSCI

Sybase  
Sybase Server (COTS)

Sybase  
Sybase Server (COTS)

V0 to ECS Gateway Server  
EcDmV0ToECSGateway

**Version Zero Gateway (V0 GTWAY) CSCI**

Breaks down Query and generates calls to inventory database; packages and returns results

Database; contains metadata for search and retrieval

2

Storage Management (STMGT) CSCI

Request Manager  
EcDsStRequest Manager

Pull Monitor Process  
EcDsStPullMonitorServer

Data Base  
Sybase Server (COTS)

Data Base  
Sybase Server (COTS)

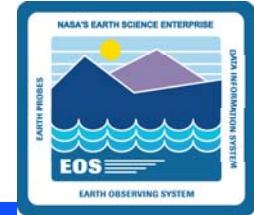
Storage Management (STMGT) CSCI

Inventory DB

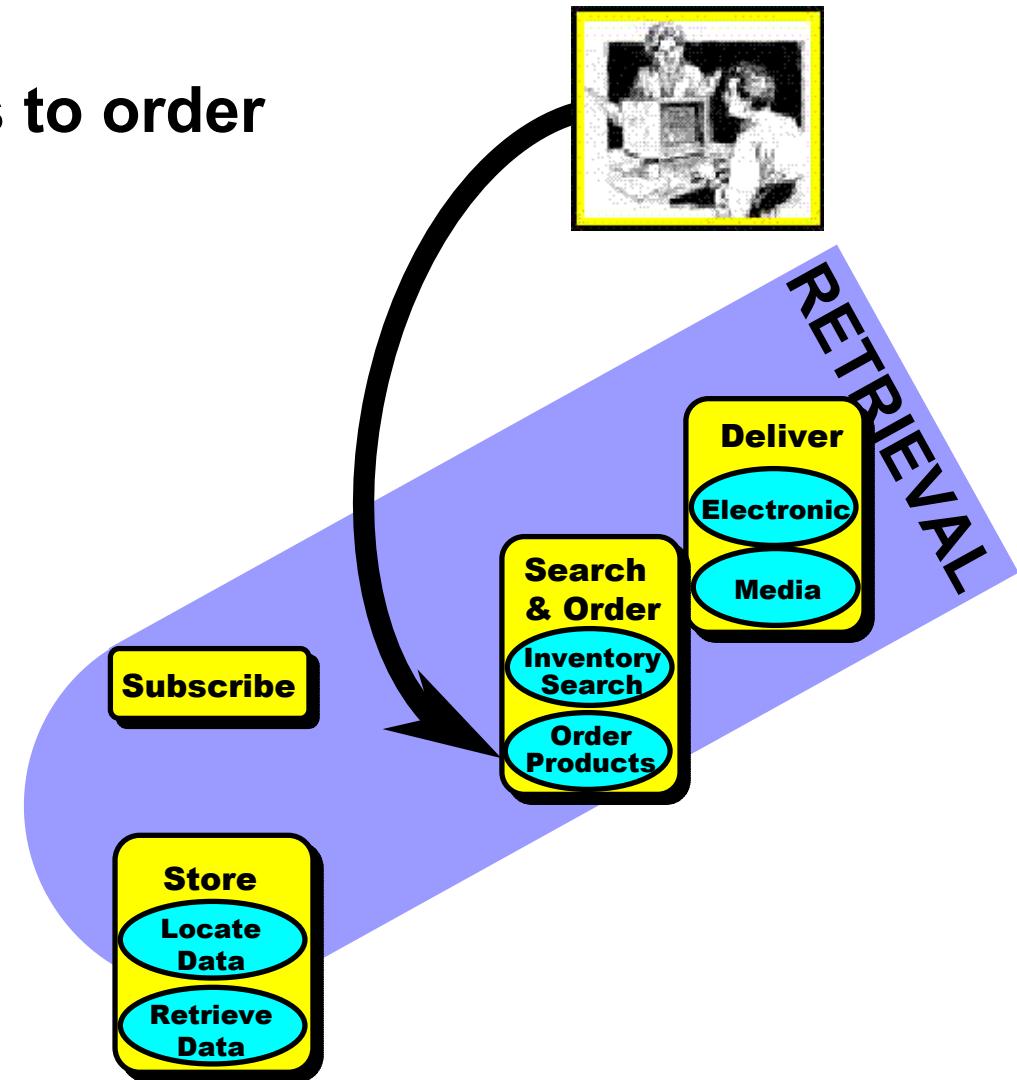


Provides media options associated with archived data to V0 Gateway

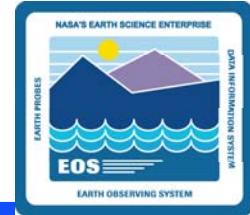
# MODIS: Data Access (Cont.)



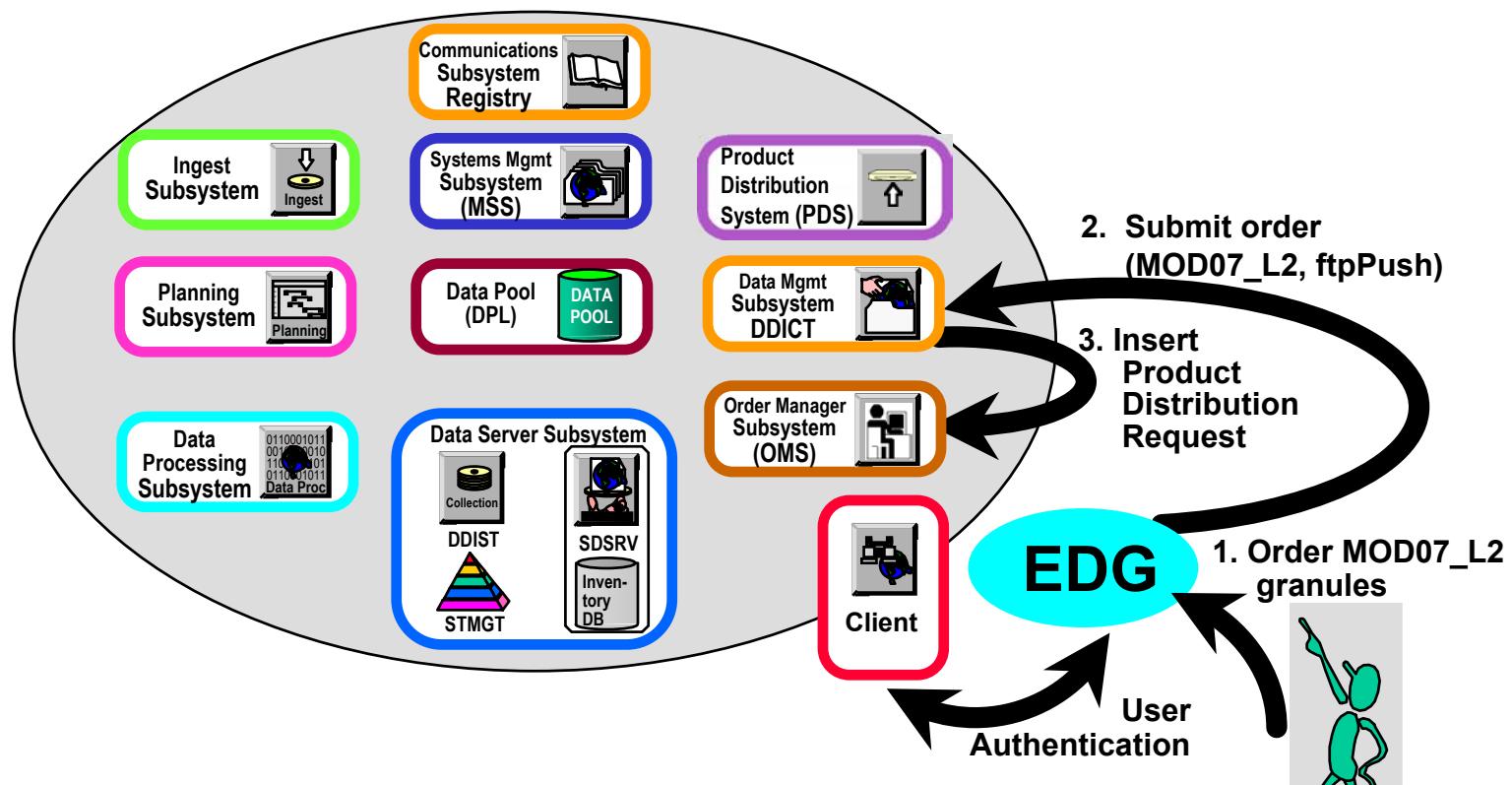
Science User decides to order  
granules of interest



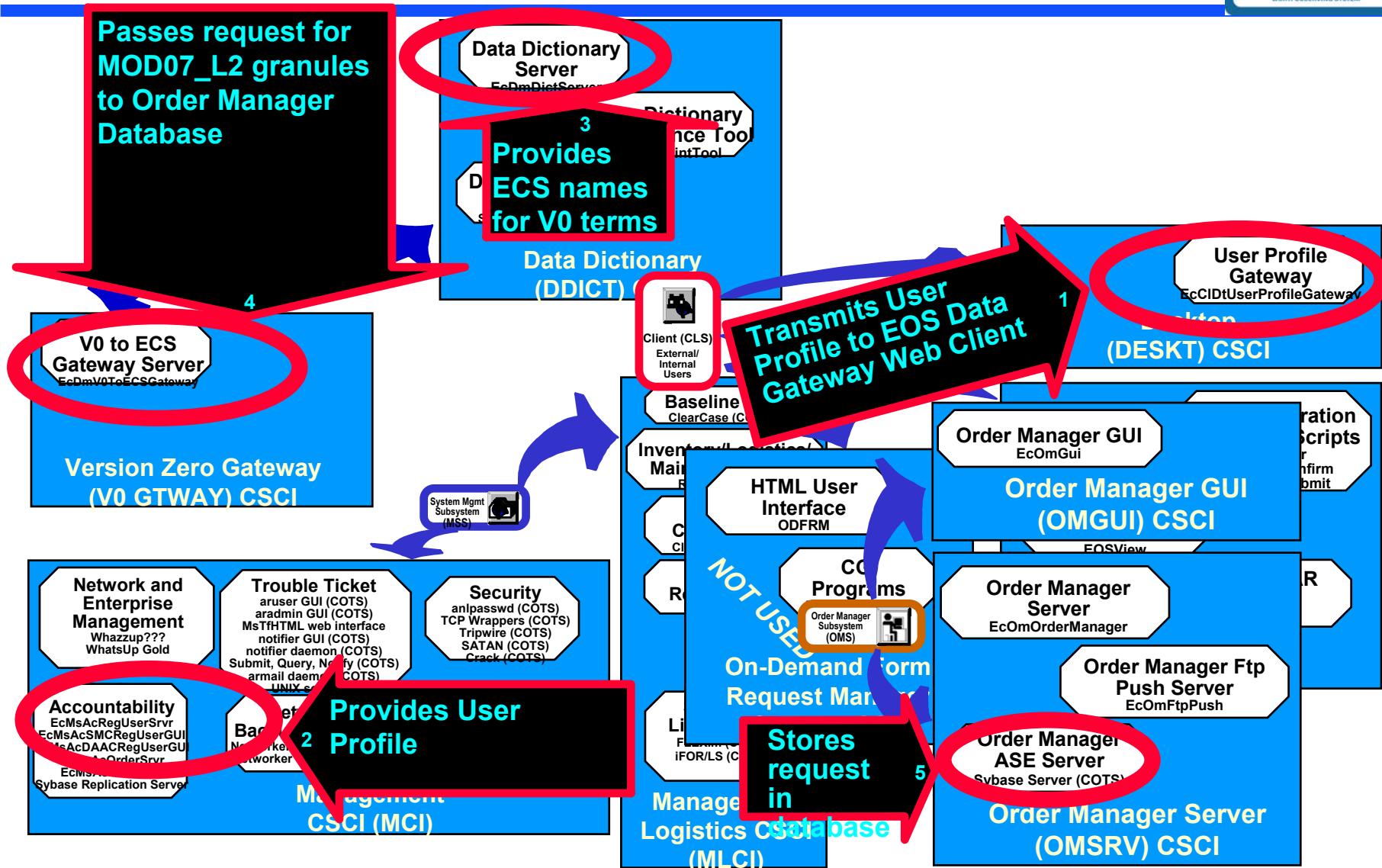
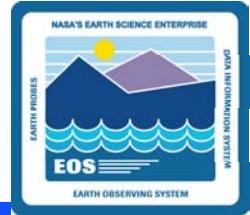
# MODIS: Order MOD07\_L2



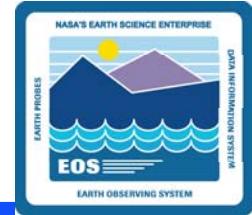
Science User uses EOS Data Gateway Web Client to order MOD07\_L2 Granules via ftp push.



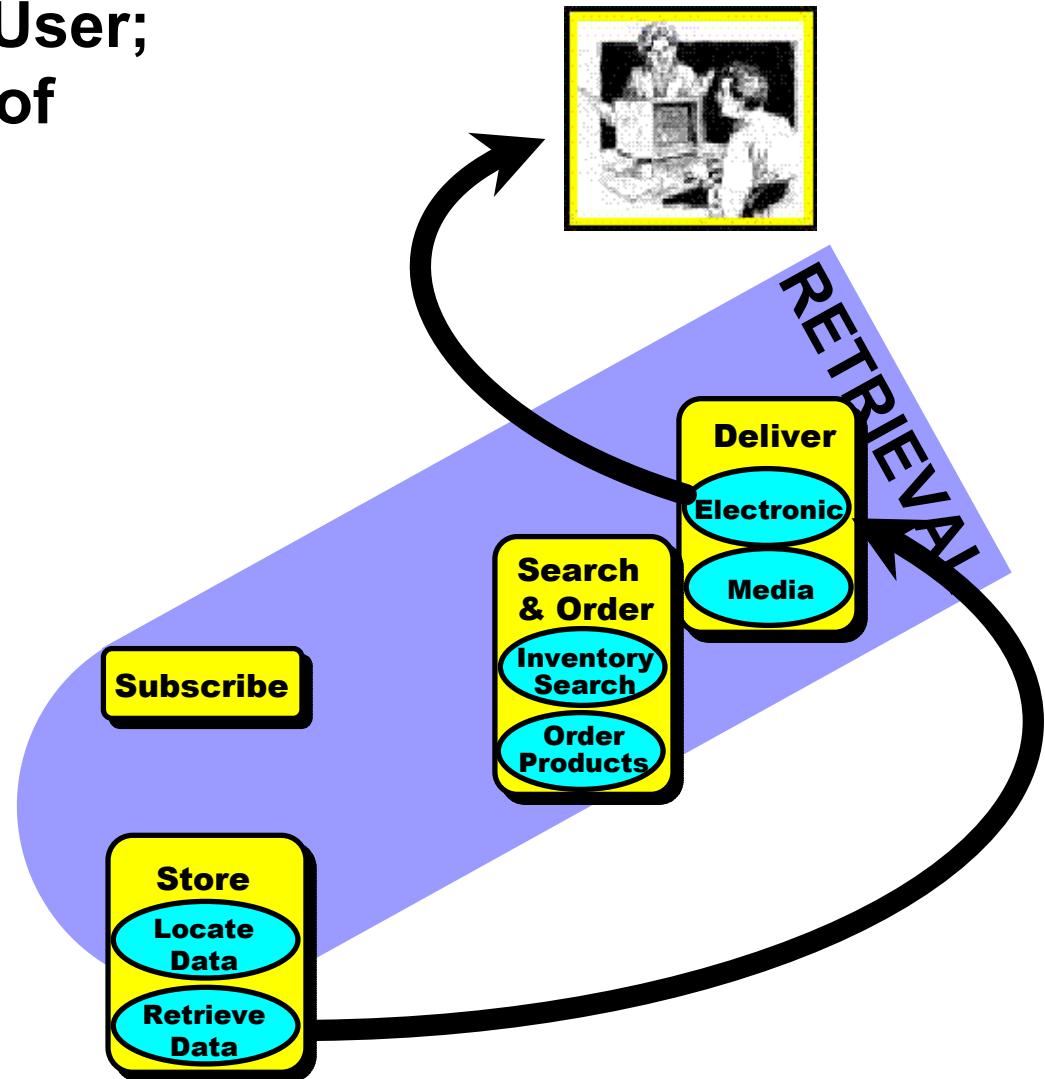
# MODIS: CSCI/Component Role in Order MOD07\_L2



# MODIS: Data Access (Cont.)



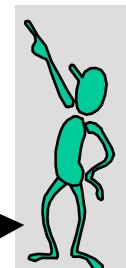
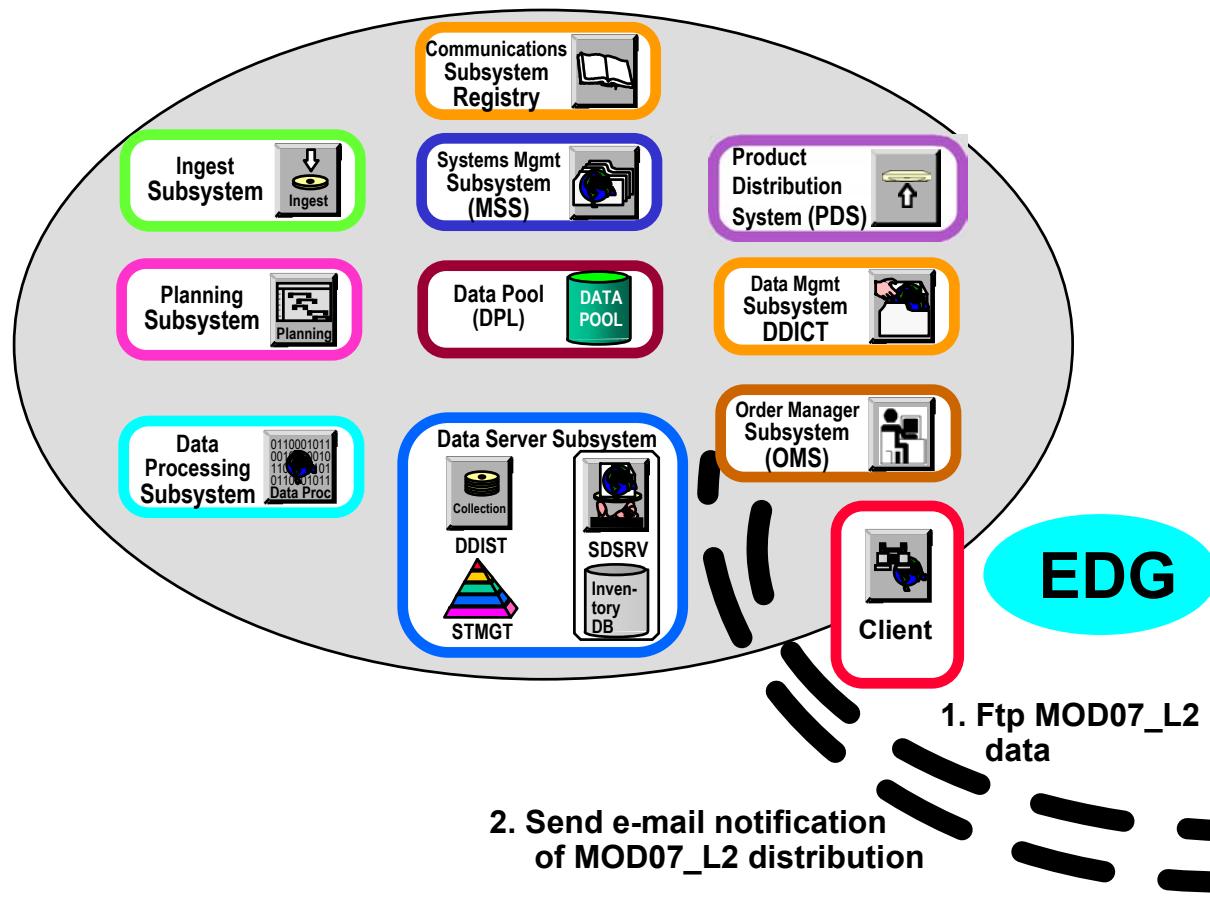
Ftp data to Science User;  
notify Science User of  
distribution



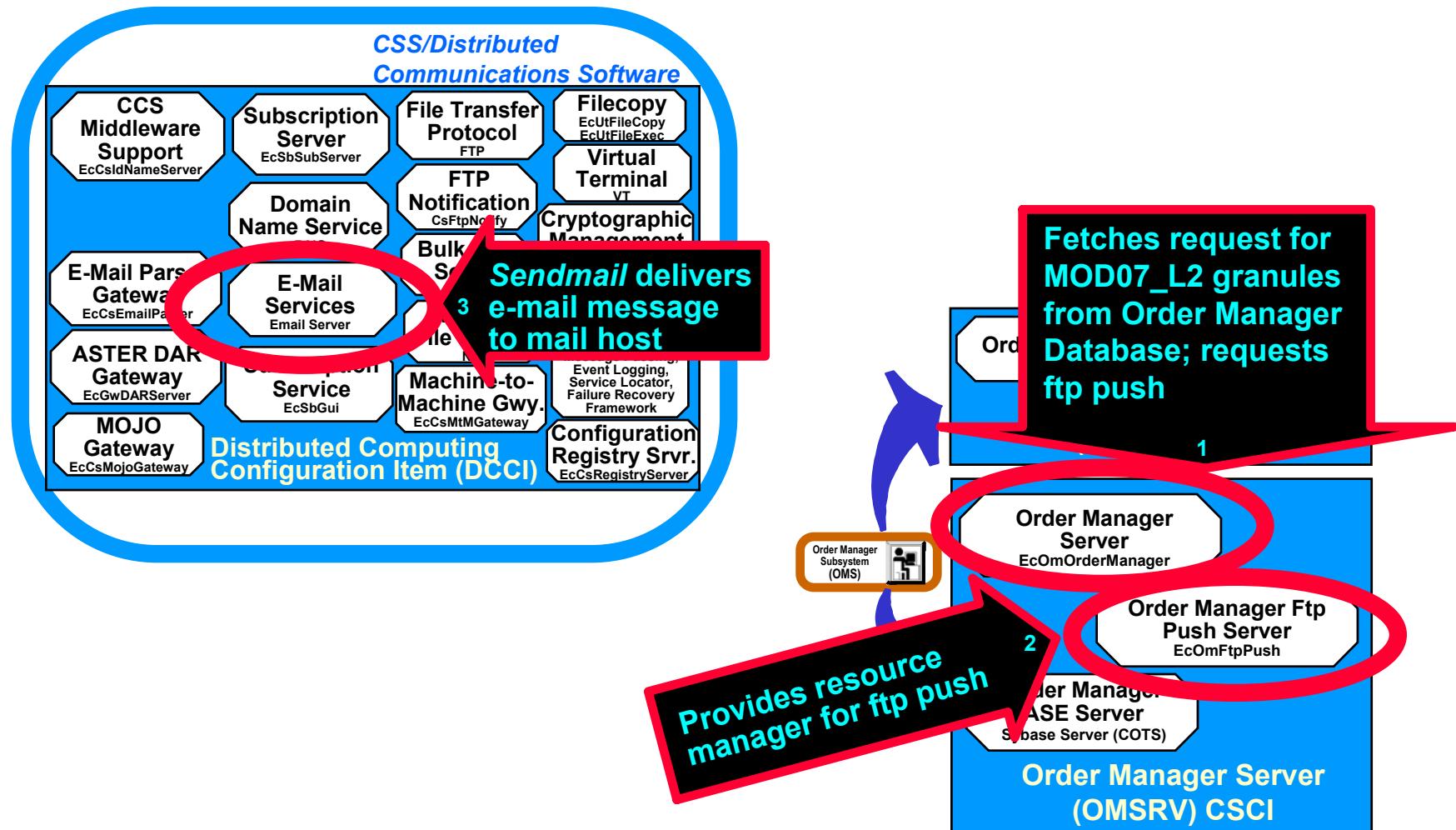


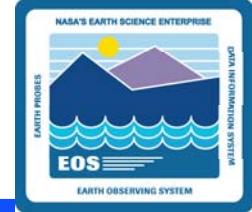
# MODIS: Distribute MOD07\_L2

Push MOD07\_L2 data to Science User's workstation. Send e-mail to Science User with notification of distribution.



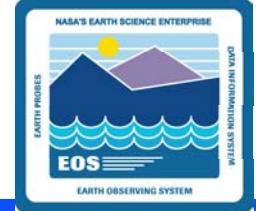
# MODIS: CSCI/Component Role in Distribute MOD07\_L2





# Summary

- Thirteen subsystems (counting PDS)
- Special Access: ASTER
  - DAR
  - Expedited Data Support
- Data Transfer from External Provider to ECS
  - DTF-2 Tape Ingest
  - Polling Ingest
- Planning and Data Processing
  - Standing Orders
  - On-Demand Processing: Chaining
  - QA Update
- Data Access and Distribution
  - User Registration
  - Data Search
  - Electronic Distribution



# References

- 305-EMD-001, *Release 7 Segment/Design Specification for the EMD Project*\*
- 313-EMD-001, *Release 7 ECS Internal Interface Control Document for the EMD Project*\*

\*Note: These documents are available on EDHS (<http://edhs1.gsfc.nasa.gov>).